Volume VI, 2007

University of Wisconsin-Stout

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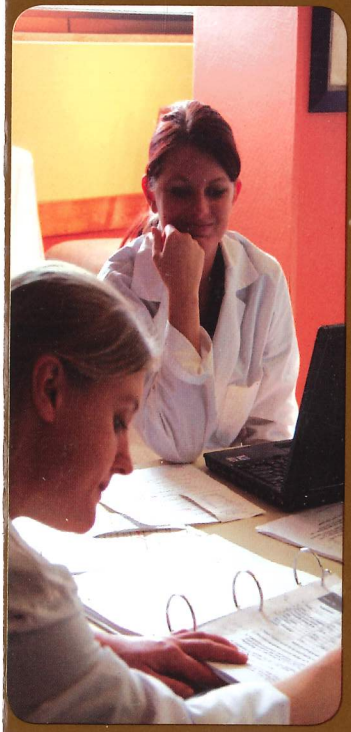

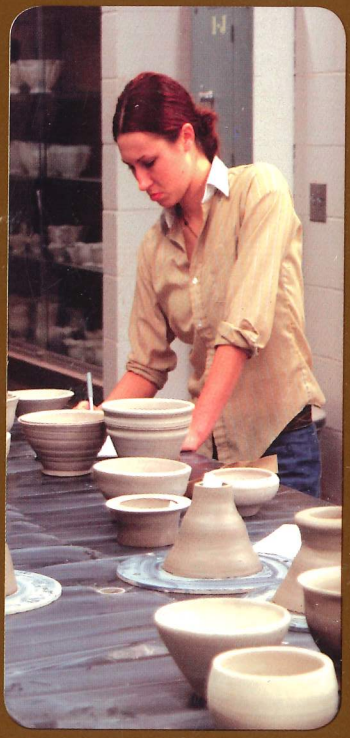

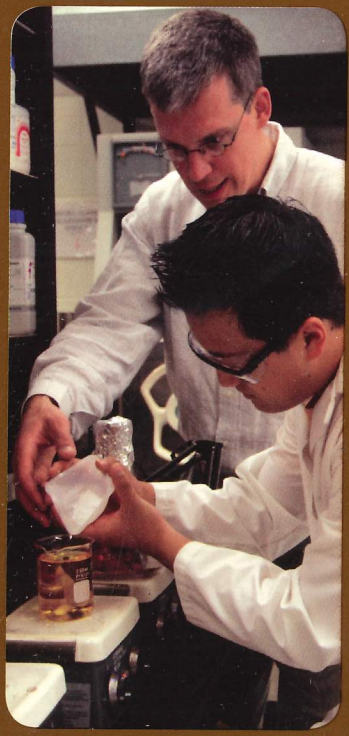

learning *experience* *opportunity*

University of Wisconsin-Stout

Journal of Student Research

Volume VI, 2007

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University of Wisconsin-Stout Journal of Student Research, Volume VI, April 2007.

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Dedication

This edition of the Journal of Student Research is dedicated to the memory of Robert A. Sedlak who passed away on November 7, 2006. Bob, an advocate for the Journal, was a strong supporter of undergraduate and graduate research at the University of Wisconsin-Stout. During his 23 years at Stout the needs of the students were foremost in his thoughts. The spirit of Bob will live on in the Journal of Student Research.

Foreword

Welcome to the 6th Edition of the *Journal of Student Research*, part of the University of Wisconsin-Stout's continued efforts to enhance growth opportunities for undergraduate and graduate students through promotion and recognition of student scholarly activity.

The Journal provides students with a public outlet to present their works of research and scholarship. While presented in both print and online formats, the Journal's online version provides students with a competitive edge, connecting them to potential businesses, organizations, and other prospective partners.

The *Journal of Student Research* is an outward and visible sign of the University of Wisconsin-Stout's commitment to the continued development of student research. The production of the Journal is a student led endeavor. Students play an integral role in editing and formatting, cover design, and layout and printing. Members of the Research Advisory Council review student articles and provide feedback.

We would like to extend our gratitude to all persons involved in the production of the 6th Edition of the *Journal of Student Research.* To the students involved, thank you for all your hard work and dedication throughout the year. Faculty and staff, thank you for your time and effort throughout the production process and for encouraging student involvement.

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Who Gets Custody? Current perspectives of Social Work Students

Courtney L. Zuber and Kyle J. Adams
Undergraduate Students, Human Development and Family Studies

Key Words: Non-traditional parents, child custody, attitudes, fathers

Abstract
Society and the American family are changing, leading to an increasing amount of single parent households. This study investigated the attitudes of social work students regarding non-traditional child placement by surveying 23 participants at a small mid-western university. It was hypothesized that the students would have more of a negative feeling toward the non-traditional child placement versus the traditional child placement (which refers to the child being placed in the custody of the biological mother). Results indicated that there was no significant negative attitude towards the non-traditional child placement situation and that custody is generally viewed as equal. Findings did not support the hypothesis and literature in that more of a negative attitude would be placed on the non-traditional child placement. Implications for practitioners is the need to be educated on child custody practices to continue a trend of equality.

Introduction

The American family structure is changing and therefore leading to an increasing amount of children who live in a single-parent household. Of the 19 million children living in single parent households in the United States, 84% live with only the mother, whereas 16% live with only the father (U.S. Census Bureau, 2002). As family structures are changing, so must attitudes and knowledge about the non-traditional child placement. Although an increasing amount of fathers are involved in a child's life, there still are significant disadvantages to the non-traditional custody seeker financially and emotionally. Our broad research problem is the perceived lack of support in society for non-traditional child placement in divorce situations.

According to the U.S. Census Bureau (2002) children are more than four times as likely to live with a single mother (23%) than to live with a single father (5%). Does this indicate that fathers are not capable of parenting, or does this represent the gender bias in custody decisions?

Custodial mothers are more likely than custodial fathers to have custody of two or three children versus one child. Can mothers provide better care for their children than non-traditional parents? For the purpose of this study non-traditional child placement includes anything other than the child being placed in the custody of the biological mother (Cohen, DeVolt, & Strong, 2005). Literature was reviewed and the attitudes surveyed of social work students regarding non-traditional child placement. Social work students were selected for this study because professional social workers will most likely have some involvement in the child placement process.

Literature Review

In researching custody placement in non-traditional situations there was a lack of studies in support of the non-traditional custody placement over the traditional custody placement. The search engine EBSCO Host was the main source of finding literature. There is little research on homosexual parents and custody placement. There is also a lack of domestic research regarding non-traditional child placement and most research in this area was conducted in European countries. Much of the research involved the controversy of father versus mother in questions of custody, and the minimal literature found in support of non-traditional custody suggests that there is gender bias in decision making regarding child placement (Braver et al., 2002).

Research affirms that there is an increasing amount of fathers awarded custody and the number of fathers who stay at home to care for children is increasing; there still lies a gender bias against this increasing number of non-traditional custody placements. Society needs to be aware of the potential dangers of gender bias for rewarding traditional custody placement and focus on the well being of children (Cooly, Hall, & Pulver, 1996; Braver, Cohen & Cookston, 2002; Silverberg, Koerner, & Wallace, 2003; Brescoll & Uhlmann, 2005).

Non-traditional custody placement is still at a large shortcoming in the legal system. Based on what is known from the literature, fathers are at a disadvantage, when wanting to take on a non-traditional role, to gain full physical placement of the child during a divorce proceeding (Brescoll & Uhlmann, 2005). There is significant difficulty financially, socially and emotionally for males who are willing to take on the non-traditional role. There is evidence that a father plays a very important part in the development of a child. Furthermore, there is little evidence that the child would adjust better when living with the parent of the same sex. In

order for society to gain a more positive stance regarding non-traditional child placement, it is necessary to evaluate the attitudes of those who are directly involved in the decision making in custody cases. Current studies show a lack of research involving non-traditional parents including homosexual parents disputing custody placement, grandparents who are awarded custody and fathers who have physical placement of the child. The current study focuses on the attitudes of social work students and their stance on non-traditional child placement including fathers and homosexuals.

Theoretical Framework

The theory that used in this study is the Feminist Theory (Chibucos et al., 2005). This theory emerged during the feminist movement in the 1960s and 1970s. Although this theory was originally meant to empower women, over the past 30 years this theory has progressed into a variety of theoretical perspectives encouraging change in social structures. The feminist perspective actively seeks to change social conditions under which women and oppressed groups live. It also has developed into a theory where gender is viewed as a social construction and argues that gender and gender relations are vital to all social life. From a feminist perspective, research must recognize the values and biases that exist among researchers and all members of society.

As applied to this study, the Feminist Theory would suggest that because of the slow movement of social change in today's society and of gender oppression, regarding traditional custody placement more positive attitudes would be portrayed in traditional custody placement versus non-traditional placement situations.

Purpose Statement

The purpose of this study was to examine the central research question, "what are the current attitudes of social work students regarding non-traditional child placement," to identify current attitudes of social work students in order to advance the knowledge and rights of non-traditional parents in divorce situations. Based on the literature and the Feminist Theory, it is predicted that our sample group will be in favor of the traditional child placement versus the non-traditional child placement situation. It is also predicted that the sample will support findings that fathers have a significant disadvantage for custody placement based on gender bias. It is hypothesized that the social work students will favor traditional child placement versus non-traditional

child placement as supported by Braver et al. (2002).

Methods

Participants

The site of this study was at a small Midwestern university. Participants included 23 social work students. Of these 21 were female and two were male. The age range of the participants were seven participants from 18-21 years of age, nine between the ages of 22-25 and the remaining seven were 26 years or older. In terms of academic status, there were six juniors, 15 seniors and two non-traditional returning students.

Research Design

The purpose of this is to identify current attitudes from the sample population and then be able to use that data to generalize about a larger population of similar students in a social work course. This survey design type is best described as a cross sectional study design in that it capture attitudes from a cross section of the population at one point in time. The form of data collection was self administered questionnaires. The rational for using this method is that it was the most efficient method to gather the data directly on campus due to the fast pace of the research course, convenience, low cost, and the quick return of data. The study used a non-random purposive sample design, as the purpose was to gather information from students in a specific course who would have the knowledge base to answer questions regarding non-traditional and traditional child placement. The ethical protection of human subjects was provided by completing the Human Subjects Institutional Review Board (IRB) training; this study received approval from the IRB.

Data Collection Instrument

In order to address social work students regarding non-traditional child placement a survey was designed. The survey included a cover letter with an implied consent which included a description of the study, definition of any terms not commonly known, risks and benefits, time commitment, voluntary participation, confidentiality, and contact information of the research team and the supervisor as well as the instructions for completing the survey. The survey consisted of three demographic questions relating to gender, age, and academic status. Participants were then given five closed-ended statements based on a 5-point Likert scale which measured the intensity of the respondents'

attitudes ranging from one (strongly disagree) to five (strongly agree). Questions were formed by the literature and theory regarding what factors related to the attitudes of non-traditional child placement.

The survey instrument has both face validity and content validity, because the questions and concepts addressed in the survey are literature inspired and cover a full range of concepts under the larger topic. The questions address a broad range of issues regarding non-traditional child placement as well as traditional child placement. To increase the validity, the survey was piloted to two undergraduate students. Feed back indicated that the survey was clear and ready for distribution.

Procedure

To collect data for the study, the professor teaching the social work class was approched. We explained the research study and how we would like to survey his students. A copy of the survey was sent to the professor before the survey was administered. The students in the social work class room were approched on Tuesday, October 26, 2006. Students were asked to participate and informed that the survey was voluntary. The implied consent form was read aloud in order to clarify the purpose of the study. The survey was not randomized in order to obtain the targeted sample number. To maintain the most confidentiality possible, and for more accurate reports, participants were provided a manila envolpe to put surveys in when completed. To get the most accurate information possible, the instructor of the class and the researchers were not present in the classroom while the survey was being taken. Because the information in the survey could be considered sensitive subject content, it was believed that standing in the class room with the participants might increase the socially acceptable responses instead of their authentic attitudes. Collected surveys were kept in a secure locked location in the room of one of the researchers until data analysis.

Data Analysis Plan

The data was first "cleaned" for any missing data. The "cleaned" surveys were then "coded" using acronyms for each variable. The first three questions on the survey were demographic variables: age, academic status, and gender. Each survey statement was a dependent variable and given an acronym name: To determine gender roles influencing child placement (RLS), if the participant had feelings that the heterosexual mother is the first choice for full child custody placement (FST), if the participants believe that homosexuals deserve an equal opportunity for

custody placement regardless of sexual orientation (EQL), if lesbian mothers have preferred child custody placement over fathers (PFD), and if fathers deserve the same type of opportunity for child placement as mothers (OPP). To analyze the data, the data-analyzing computer program called *Statistical Package for the Social Sciences (SPSS)*, was used.

Results

All variables were subjected to a frequency distribution analysis. Results indicated that there was no missing data. The Cronbach's Alpha measure of reliability in our analysis was 0.403.

Table 1

Frequencies

Variable	SD	D	U	A	SA	Total
RLS	17.4%	17.4%	4.3%	39.1%	21.7%	100.0%
FST	26.1%	17.4%	13.0%	26.1%	17.4%	100.0%
EQL	0.0%	0.0%	8.7%	21.7%	69.6%	100.0%
PFD	17.4%	39.1%	39.1%	4.3%	0.0%	100.0%
OPP	0.0%	4.3%	4.3%	21.7%	69.6%	100.0%

Note. (RLS) = Traditional gender roles influence custody placement; (FST) = Heterosexual biological mother is the first choice for full child custody placement; (EQL) = Homosexuals deserve an equal opportunity for custody placement regardless of sexual orientation; (PFD) = Lesbian mothers have preferred child custody placement over fathers; (OPP) = Fathers deserve the same type of opportunity for child placement as mothers.

Discussion

Overall, the hypothesis was not supported by the findings. It was hypothesized that the majority of students would be opposed to non-traditional child placement. Our findings suggest that social work students are divided regarding traditional child placement and non-traditional child placement, with an equal amount of students agreeing or strongly agreeing and also disagreeing and strongly disagreeing to non-traditional child placement. Results were not supported by the findings from Brescoll and Uhlmann (2005) in that society often places

more of a negative attitude on non-traditional child placement than on traditional child placement. Results found that more students were in favor of equal opportunity between males and females, and heterosexual versus homosexual parents. However, the results of the question regarding heterosexual biological mothers being the first choice for full child custody placement were equally divided. Findings show that society may be shifting and non-traditional child placement may be becoming more socially acceptable. A few students added comments at the end of the survey stating that they believe it depends on the situation if the custody placement should be viewed as equal between traditional and non-traditional child placement.

The lack of support for the hypothesis is contributed to a couple factors, including a lack of research on students' attitudes regarding non-traditional child placement and the lack of education in society regarding non-traditional child placement. Based on the literature, we believed that fathers and other non-traditional child placement settings are at a significant disadvantage for child custody placement. A study conducted by Brescoll and Uhlmann (2005) found negative attitudes toward non-traditional parents in society. Also, Braver et al. (2002) found that the bias in the legal system tends to favor mothers. This study is interesting because our results showed more of a positive attitude towards non-traditional child placement compared to the current literature. It was also hypothesized that social work students would be in favor of the mother having child placement versus the father or grandparent having child placement. This is also supported by the findings from Braver et al. (2002).

According to the Feminist Theory, because of the slow movement of social change in today's society and of gender oppression there would be more positive attitudes portrayed in traditional child custody placement than in non-traditional child custody placement situations (Chibucos et al., 2005). This supports the hypothesis but disagrees with the findings. Results show that the majority of social work students agreed or strongly agreed with equality between the non-traditional child placements versus the traditional placement. Therefore, gender oppression is not as prevailing with the attitudes of the social work students.

Limitations

Due to the small sample size, it is unlikely that the results of this study can be generalized beyond social work students. Another limitation

is the lack of randomization as a result of time constraints and number of available participants. Another limit was the lack of gender and ethnic diversity in the sample.

Implications for Practitioners

Results suggest that non-traditional child placement, defined as anything other than the child being placed in the custody of the biological mother, is still not as socially acceptable as traditional child placement, which is defined as a child being placed in the immediate care biological mother according to social work students. However, this study does support the equality of placement between males and females. This study can be used to inform current persons involved in the child custody placement such as social workers, *guardian ad litem* or attorneys.

Implications for Future Research

Recommendations for future research are to use a larger, randomized, and more diverse sample in order to allow for generalization of the attitudes of persons involved in the child custody placement process. If this study were to be replicated we would suggest either re-wording or discarding the statement: if fathers deserve the same type of opportunity for child placement as mothers (OPP). According to the reliability statistics, the Cronbach's Alpha would increase from 0.403 to 0.512 if this question were taken out of the survey. This question is too broad and does not specifically relate to non-traditional child placement and also generalizes equality between males and females. We also believe that child custody assessors need to be educated on child custody practices to continue a trend of equality.

Conclusion

As a result of this study, it is hoped that society will learn to create equal opportunity for non-traditional child placement. According to the 2002 U.S Census Bureau, approximately 16.5 million children live with only their mother, whereas only 3.2 million live only with their father and 2.8 million live with neither parent. We deem that the attitudes of the social work students are more towards equality between the traditional and non-traditional child placement, even though current literature supports the traditional child placement. In conclusion, we hope to contribute one small step to the literature and hope that non-traditional child placement will be viewed just as equitable as traditional child placement.

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Zebrafish Functional Genomics Development at UW-Stout

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Keywords: Antisense, brine shrimp, embryo, functional genomics, knockdown, microinjection, model organism, morpholino, tyrosinase, yeast, zebrafish

Abstract
Since the completion of the human genome sequencing project, morpholino phosphorodiamidate oligonucleotide (MO) knockdown in zebrafish has been increasingly used to elucidate human gene function. As part of the effort to expand the functional genomics screening capacity at the University of Wisconsin-Stout, this project investigated MO microinjection techniques, embryo production, and brine shrimp survival. One- to two-cell embryos injected with the pigment-inhibiting tyrosinase MO were observed at 48 hours post fertilization for pigmentation. Injection efficiency was calculated by dividing the number of zebrafish lacking pigment by the total number of injected zebrafish. To obtain sufficient embryos for MO experiments, the effects of a dry food diet and live (brine shrimp) food diet on embryo production were analyzed. Effects of a yeast diet on brine shrimp survival were also studied to provide zebrafish with healthy brine shrimp. Results included a 92% injection efficiency, greater embryo production with the dry food diet, and increased brine shrimp survival with a yeast diet. This work provided an important foundation in the development of a reverse-genetic screen for future students.

Introduction

The sequencing of the human genome has yielded thousands of potential genes with unknown function (HGMIS, 2005). Due to the similarities in genetic composition across species and technological advancements, the functions of these genes can be determined relatively quickly by screening them in model organisms, such as the zebrafish (Pickart et al., 2004; Dahm & Geisler, 2006). Common screening tools for deciphering gene function include mutagenesis and forward- and reverse-genetic screens. Mutagenesis screens mutate genes and determine gene function based on what is observed (the phenotype). Forward-genetic screens generally consist of exposing the organism to a chemical, observing the phenotype, and ascertaining the gene affected. Reverse-

genetic screens utilize agents such as morpholino phosphorodiamidate oligonucleotides (MOs) to alter specific gene expression and phenotype and provide insight to gene function. All three of these methods have been used in zebrafish.

With the genome of the zebrafish approximately 70% sequenced (TDRSP, 2006), MO technology is becoming a popular antisense tool (targets the matching nucleic acid sense strand). MOs are synthetically-made, neutral, nucleic acid analogs that can be ordered online from Gene Tools, LCC (Philomath, OR) (Pickart et al., 2006; Deiters & Yoder, 2006). Structurally, MOs have a morpholine group in place of the ribose sugar and a phosphorodiamidate (not phosphodiester) backbone. As a result of these properties, MOs are soluble, bind to specific messenger ribonucleic acid (mRNA) sequences via Watson-Crick base pairing, and are not degraded as easily as some antisense mechanisms. Functionally, MOs work by binding to and preventing mRNA from translating into protein, thereby inhibiting gene expression. The ~25 nucleotide-long sequence of a MO is designed to bind to the 5' end of the mRNA (to block cellular translational machinery) and, thus, generally contains the translational start codon AUG. Alternatively, MOs can be designed to bind to splice sites to alter or prevent intron splicing, which inhibits the production of normal protein. Gene sequence information for MO design can be obtained from such websites as The Zebrafish Information Network (www.zfin.org), Ensembl Zebrafish (www.ensembl.org/Danio_rerio), and others at Zebrafish Genome Resources (www.ncbi.nlm.nih.gov/genome/guide/zebrafish). Once designed, MOs can be microinjected into an embryo (typically at the one to two-cell stage) and the effects analyzed hours to days afterward. The ability to quickly assess gene function is one of the many advantages of using zebrafish.

A native to the Ganges River in India, the ~2-inch black-striped zebrafish is an emerging model organism (Badman et al., n. d.). Named *Danio rerio* in 1822 by Francis Hamilton-Buchanan, the zebrafish's potential in genetic research was not recognized until the 1970s by the viral geneticist and fish hobbyist George Streisinger, who highlighted the advantages of zebrafish in the journal *Nature* (Dahm, 2006). Indeed, the zebrafish has many favorable attributes (Badman et al.). They are easy to maintain at low labor and cost. Each female can produce hundreds of eggs per week, which allows for plentiful data collection. The embryos (eggs fertilized by sperm) develop outside the females in transparent sac-like chorions, so their development can be readily observed. Easily manipulated embryos allow such technologies as MO knockdown to

determine gene function. Compared to a human gestation of nine months, zebrafish's development time of 48 hours equates to quick analysis. Importantly, the conservation of genes and biological processes between humans and zebrafish increases the relevancy of data collected. Research fields utilizing the zebrafish are very diverse, from the study of organ development (organogenesis), nerves, blood vessels (angiogenesis and vasculargenesis), and bone (osteogenesis) to cancer research, toxicological assays, and therapeutic drug screening (Pickart et al., 2004; Badman et al.). Today, over 500 laboratories utilize the zebrafish (Dahm), including the $10-million, 5000-square foot facility in Bethesda, Maryland that has over a half million zebrafish capacity (Agres, 2003).

In spring 2005, the University of Wisconsin-Stout's Zebrafish Laboratory was started by Assistant Professor Michael A. Pickart as part of the Genomics Technology Access Core (GTAC) facility to enable students to conduct hands-on, cutting-edge biological research. Methods for chemical screening were established that fall (Hoage, 2005). The following spring, techniques for using MO microinjection technology were developed and tested (this article).

Initiated in support of UW-Stout's growing Biotechnology curriculum and the GTAC, this project was the first student-lead effort to develop the functional genomics capacity of the Zebrafish Laboratory. As diagramed in Figure 1, the project consisted of three parts: MO microinjection techniques, embryo production, and brine shrimp (*Aretemia*) survival. Microinjection techniques referred to the manipulation of and efficient MO injection into zebrafish embryos. To establish microinjection techniques and measure injection efficiency, the tyrosinase MO was injected into 1- to 2-cell embryos. Similar to the human disease condition oculocutaneous albinism (OCA1) characterized by a lack of pigment in the eyes, hair, and skin, the tyrosinase MO prevented the formation of the tyrosinase protein and the production of black pigment (melanin) in zebrafish (Pickart et al., 2004). Injection efficiency was easily measured by dividing the number of zebrafish lacking pigment by the total number of injected zebrafish at 48 hours post fertilization (hpf). The effects of a dry food diet and live (brine shrimp) food diet on embryo production were analyzed to obtain sufficient embryos for injection experiments. To provide adequate amounts of healthy brine shrimp, the effects of a yeast diet on brine shrimp survival were studied. Ideas for the live food diet and yeast diet came from Westerfield (2000) and Cleveland et al. (1998), respectfully.

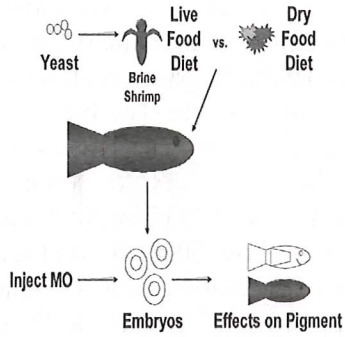

Figure 1. Overview of project.

Methods

Brine Shrimp Survival

Sanders brine shrimp eggs (1.5 g; 85% hatch, Ogden, UT) were grown in ProAquatica funnel hatchers (Gotha, FL) containing 1.6 L of 28.5°C, pH 8, 20-parts per thousand (ppt) Instant Ocean salt (Aquarium Systems, Mentor, OH) water and aerated at a medium flow rate. They were fed 0, 20, or 40 drops of 2 mg/mL Fleischmann's active dry yeast (Fenton, MO) solution on Days 0, 1, and 2. Two to six 1-mL samples of brine shrimp were counted on Days 1, 2, and 3 in Petri dishes with a microscope. The "day's count" was the average number of live brine shrimp. Percent survival was calculated by dividing the day's count by Day 1's count. For detailed protocols on hatching, growing, and harvesting brine shrimp, contact the author at hoaget@uwstout.edu for a copy of *Brine Shrimp Husbandry* (2006).

Embryo Production

Dry Food Diet

One batch of 50 zebrafish was fed a dry food diet consisting of TetraMin flake food (Tetra, Blacksburg, VA). Males and females were combined into one 10-gallon tank every other week on Monday evening of "collection week." Fifteen minutes before the automatic lights turned on at 9 AM ("dawn"), nine randomly selected fish were placed in each of four breeding boxes containing fish water (28.5°C, 59.9 mg/L Instant Ocean salt).

Live Food Diet

The other batch of 50 zebrafish was fed a live food diet consisting of dry flake food and 6 mL (1:4 diluted) brine shrimp daily. Males and females were combined as described above. Fifteen minutes before dawn, six females and three males were placed in each of four breeding boxes. The methods were similar to those used by Westerfield (2000).

All fish were on a 14 hour light: 12 hour dark cycle.

Embryo Collection

At 9:00 AM, 9:15 AM, 9:30 AM, and 12:00 PM, embryos were collected with a sieve, transferred with salt water to a labeled Petri dish, and manually counted. Designed and constructed by Dr. Pickart, the breeding boxes allowed for easy and inexpensive embryo collection. Consisting of two 8-cup, deep-dish containers and lid (The Glad Products Company, Oakland, CA), each breeding box had an inner compartment and outer compartment with cover (i.e., lid). The inner compartment had the bottom one inch removed and a 5.5 inch x 7.75 inch rectangular piece of polyethylene mesh (3 mm x 3 mm squares; InterNet, Inc., Minneapolis, Minnesota) stapled in it to form a barrier through which only embryos and water could pass. This inner compartment was placed into the outer compartment and filled with salt water. Fish were transferred to the inner compartment for embryo production. To collect the embryos, the inner compartment containing the fish was transferred to another outer compartment containing salt water. Water in the outer compartment containing the embryos was poured through a sieve. A squirt bottle was then used to transfer the embryos to a Petri dish containing salt water. Having a diameter of ~ 1.5 mm, the embryos were counted with the unaided eye. The analysis was conducted for one month. For detailed methods of embryo collection and breeding box construction, contact the author for a copy of *Basic Zebrafish Husbandry for the Classroom* (2006).

MO Microinjection Techniques

Injection needles were made from 1-mm diameter capillary tubes (Fisher Scientific, Raleigh, NC) using a P-97 Flaming/Brown micropipette puller (Sutter Instruments, Novato, CA). Microloader pipette tips (Fisher Scientific) were used to load the MO into the needles. After the end of the needle had been snipped with a Jewelers forceps (Fisher Scientific), it was calibrated with a capillary microloader pipette tip (Fisher Scientific) as described in *Where Art Thou Stripes, Zebrafish?*

(Hoage[3], 2006). Briefly, the capillary was placed over the end of the needle, and MO was injected twice at one second each. The volume distance was measured in millimeters and divided by two. That number and the *Injection Time Standardization Table* were used to determine time (in milliseconds x 10) of injection. For injection, embryos were transferred to an agar-coated injection chamber plate. Tyrosinase MO was injected at 3, 6, or 9 nanograms (ng) into thirty 1- to 2-cell stage embryos with a pico-injector (Warner Instruments, Hamden, CT). The tyrosinase MO was made by Gene Tools, LLC and contained the sequence 5'-GAGACATGATGATGAAGAGTCGAGG-3' (Pickart et al., 2004). Non-injected embryos were used as controls. Unfertilized and dead embryos were removed before counting. Injection efficiency was calculated by dividing the number of reduced-pigment embryos by the total number of living embryos at 48 hpf. Reduced pigment was defined as at least 75% reduction in overall black pigment as compared to the control.

Results

Increasing Brine Shrimp Survival with Yeast

The highest brine shrimp percent survival (97%) was obtained using 20 drops of yeast on Day 0, 40 drops on Day 1, and 0 drops on Day 2 (see Figure 2). In general, brine shrimp survival increased with increasing amounts of yeast, whereas a yeast-free diet was characterized by a decrease in brine shrimp survival by Day 3. Within the same yeast-positive conditions, the brine shrimp percent survival increased slightly from Day 2 to Day 3.

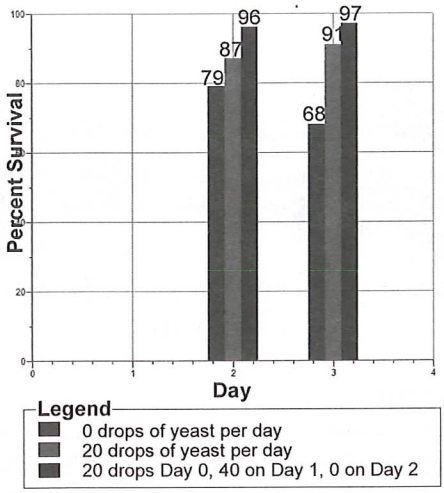

Figure 2. Effects of yeast on brine shrimp survival.

Effects of Diet on Embryo Production

Fish on the dry food diet yielded more embryos than those on the live food diet (see Table 1). The number of embryos produced on Tuesday was similar in both groups, decreased the following day, and increased as the week progressed, with the exception of the live food diet batch on Friday. Both conditions resulted in fewer embryos per week than expected.

Table 1

Average Embryos Produced Per 36 Fish Per Collection Week

Diet	Monday	Tuesday	Wednesday	Thursday	Friday	Total
Dry	NA	181	40	118	228	567
Live	NA	156	20	61	0	237

Note. Fish were not set up for a Monday collection.

Injection Efficiency

The 3-, 6-, and 9-ng tyrosinase MO conditions yielded zebrafish larvae having at least 75% overall reduced black pigment at 48 hpf (see Figure 3). In general, melanin was not visually observed in the head, eyes, and yolk and was reduced at the top and bottom of the tail.

The injection efficiency increased to 92% after four practice injection experiments.

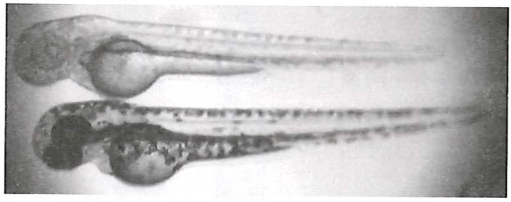

Figure 3. Top: Tyrsonase-MO injected larvae. Bottom: Wild-type larvae. (~3-mm length)

Discussion and Conclusion

MO knockdown in zebrafish is a powerful functional genomics tool for deciphering gene function. However, to be able to conduct a MO screen, efficient microinjection techniques must be established and sufficient embryos produced. Thus, this project focused on developing microinjection techniques, maximizing embryo production, and increasing brine shrimp survival. As described below, some results supported and others opposed the literature. All results are springboards for future research.

Cleveland's (1998) advice of sustaining brine shrimp with yeast was accurate according to the results obtained in this study. Brine shrimp survival increased as the amount of yeast increased. It would, however, be expected that surpassing the yeast concentration that sustains brine shrimp could lead to what Cleveland warned as a foul culture (i.e., brine shrimp death). The slight increase within the same yeast-positive conditions from Day 2 to 3 could have resulted from the hatching of additional brine shrimp after Day 2's count. Possible future brine shrimp research can focus on hatcher type, light, water temperature, pH, salt water concentration, aeration, yeast concentration, and duration of analysis.

The embryo production data contradict the literature (Westerfield, 2000; Badman et al., n. d.) and should be validated by switching the diets of the fish and comparing the results. Normally, a female zebrafish can produce at least a hundred eggs per week. However, the fish on the live food diet produced only 237 embryos a week per 24 female zebrafish. Furthermore, instead of the expected increase in embryo production, fewer embryos were collected from fish on the live food diet than those on the dry food diet. The previous fall, approximately a thousand

embryos were obtained per week from fish on the dry food diet (data not shown) and seemed to decrease the following months to reported levels. Factors to analyze and possibly increase embryo production include water temperature, water quality, time of set up, breeding frequency, seasons, number of fish in the main tanks and breeding boxes, ratio of males/females in the breeding boxes, age, quantity of food, and hormone supplementation.

The tyrosinase MO-injected zebrafish had at least 75% overall reduction in black pigment at 48 hpf, which supports the observations noted by Pickart et al. (2004) in which tyrosinase pigmentation can be knocked down up to 50 hpf, with some pigment formation increasing after Day 2. A future project could analyze the anatomical locations and time points of melanin formation in control zebrafish and tyrosinase-MO injected zebrafish. The 92% injection efficiency will continue to improve with practice. Additionally, dyes such as phenol red can be combined with the morpholino to better visualize the liquid being injected into the yolk. An alternative method of measuring injection efficiency is to tag the MO with a green fluorescent protein (GFP) and use a fluorescent microscope to count the fluorescing embryos at 4 hpf.

In summary, valuable techniques and methods have been developed to increase UW-Stout's functional genomics screening capacity. A 97% brine shrimp percent survival was obtained using 20 drops of yeast on Day 0, 40 drops on Day 1, and 0 drops on Day 2. The batch of zebrafish fed the dry food diet produced more embryos compared to those on the live food diet; however, the diets must be switched and results compared to validate the results. A 92% injection efficiency is adequate to begin screening other MOs and should continue to increase with practice. The MO microinjection techniques were compiled into a lab module (Hoage[2], 2006) that has been incorporated into the Applied Science, Biotechnology concentration curriculum. A brine shrimp husbandry booklet (Hoage[2], 2006) was also created as a template for future research and for the Zebrafish Laboratory personnel. With more undergraduates learning these microinjection techniques and increased funding to further develop UW-Stout's GTAC facility, the Zebrafish Laboratory will be in the position to begin reverse-genetic screening and elucidate gene function.

Acknowledgements

UW-Stout Assistant Professor Michael A. Pickart graciously allowed the use of the zebrafish for this project and offered invaluable wisdom

throughout. A special thanks to Rebecca (Becky) Valaske for helping set up the fish, sex fish, and count embryos. Also, thanks to Shweta Kumari for helping count the brine shrimp and Zachary (Zack) Kolden and Christopher (Chris) Sluppick for creating a research video documentary of this work. This project was supported by the UW-Stout Student Research Fund Grant.

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A Linguistic Study: "Soda" and "Pop" in Wisconsin and Minnesota

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Keywords: Linguistics, Pop, Soda, Isogloss, Coke

Abstract
The following linguistic research study was performed to discover language patterns in association with the terms "pop" and "soda." Research was conducted through guided conversation with the subjects. Findings revealed that much of the research conducted in the past coincides with the findings we have tabulated with this project. Research confirmed that the information in the 2002 isogloss developed by Campbell and Plumb was accurate. There has not been a significant shift in the isogloss since 2002, and findings suggest that there may be relevant data for future studies regarding the use of brand specific names being used in place of the terms "pop" and "soda."

Introduction

The purpose of this study was to determine the use of the terms "pop" and "soda" and develop an isogloss[1] based on where the interviewed subjects were originally from. Previous linguistic studies have shown that the use of the terms "pop" and "soda," in reference to soft drinks, varies tremendously in the upper Midwest, especially as one travels from southeastern Wisconsin to the northwest and into Minnesota.

According to the map in Appendix A, the term "pop" is used more frequently in Minnesota, but in Wisconsin, the usage of the term seems to be more prevalent in the western side of the state, whereas the usage of the term "soda" remains dominant in the eastern side of Wisconsin. The term "coke" is used predominately in the southern region of the United States to refer to soft drinks. To ensure the accuracy of the data, it was necessary to take the use of this term into account, because the usage of this term could possibly spread from its roots to northern regions of the United States, including the Midwest.

1. A boundary line between places or regions that differ in a particular linguistic feature (Mish, 2004).

Previous research has shown variations in the way these terms are commonly used in the Midwest region; therefore, it was essential that the subjects of this study be from Midwestern states. Since the vast majority of students at the University of Wisconsin-Stout originate from various regions of Wisconsin and Minnesota, they were suitable subjects for this study.

Literature Review

Linguistic research has been conducted in the past to determine the usage of the terms "pop" and "soda" across the United States. The usage of the terms has changed over time and a variety of terms such as soda water, tonic, and soda pop have been used to describe soft drinks (Malmstrom & Ashley, 1963). The use of the terms "pop" and "soda" began in the 1800's, and over the course of two centuries, the usage changed greatly.

In the 1820's the term "soda pop" was used to reference a new mineral water, which later came to be known as seltzer. In 1833, carbonated water was referred to as "soda," and by the 1840's, it was being sold at soda counters that could be found in many pharmacies or drug stores. The first use of the word "pop" was in the 1940's, when a new ginger flavored beverage entered the market. Many people called this beverage "ginger pop," sometimes referred to as "ginger ale." "Soda pop" and a "bottle of pop" were commonly used by flappers and sheiks as slang terms in the 1920's (Flexner, 1976).

The Coca-Cola® product was introduced in Atlanta, Georgia, in 1887. By 1909, the product was more commonly known as Coke. By 1945, Coke was registered as a trademark, and beginning in 1955, the term was used in advertising (Flexner, 1976). Today, the term "coke" is used to reference any brand of soft drink predominately in the southern region of the United States (Campbell & Plumb, 2002). However, this trend has not become widespread in the Midwest region of the country.

Previous research indicates many people use the terms "pop" and "soda" to reference soft drinks across the northern United States; however, the dominant term used in this region is "pop." The particular usage of one term over the other seems to be determined by the region the individual is from. The fusion of these terms is prevalent in central Wisconsin where "pop" and "soda" are used interchangeably. A detailed map displaying the use of these terms in reference to soft drinks can be found in Appendix A (Campbell & Plumb, 2002).

As mentioned, in the 1920's the use of "pop" and "soda" began as

slang terms used by certain groups throughout the United States. Over time these terms moved from being slang to being commonly used by Americans to describe soft drinks. Currently, the use of the terms "pop" and "soda" seem to depend on the region from which people originate from. If a person was to move or enter into a region in which one term was dominant over the other, it is very likely that person would begin to use the dominant term. Lippi-Green (1997) states "speakers choose among sociolinguistic variants available; their choices group together in ways which are obvious and interpretable to other speakers in the community" (p. 63). If the terms continue to be used interchangeably, as they are in central Wisconsin, it is possible that one term will come to be used predominately at the exclusion of the other. Based on the literature, we hypothesized that subjects originating from the state of Minnesota would use the term "pop," and subjects originating from the state of Wisconsin would use the terms interchangeably, with a blend in the usage of the two terms in the West side of the state, and with "soda" being used more frequently on the East side of the state.

Methods

This study's primary method for collecting data was through the use of guided conversation, a method developed by William Labov, a renowned sociolinguist (Tamás, 1998). Guided conversation is the process of engaging subjects in a casual conversation in which they begin to forget they are being recorded or observed. Labov's "observer's paradox" is the theory that when subjects are aware they are being observed, their speech and various other mannerisms are affected. For this reason, the field researcher may not be able to obtain accurate information.

Interviews were conducted with seven human subjects and the conversations were recorded. Since research was conducted during Spring Holiday, subjects were more difficult to recruit. The selection of subjects was not random, but rather they were selected by chance appearance as we went to various residence halls on campus and asked students that were in the lobby or their rooms to participate.

The purpose of the conversations was to guide the subjects towards a topic or idea that would require them to use either the term "pop" or "soda." After obtaining a signed consent form and demographic information from the subject, we proceeded to ask a variety of questions about campus life at the University of Wisconsin-Stout. Conversations were recorded with the use of a laptop computer and iMovie® recording

software. The subjects of our research knew they were being recorded, but were not aware of the primary goal of the conversation. Subjects were first asked what region they were originally from or, in other words, where they grew up. This information was to used to develop an isogloss and to allow us to compare and contrast our findings with previous research. Eventually the conversation was guided to various questions regarding food service options and vending machines available on campus. Below are examples of some of the questions. Please note that these are not the only questions used while conducting our interviews, but rather specific questions that led our subjects to use the terms "pop" and/or "soda."

1. What do you think of the food service options and selection offered on campus?
2. What do you think of the vending machine options here on campus?
3. What do you think of the Pepsi® company taking over the vending here on campus?
4. Would you prefer Coca-Cola® products over Pepsi® products in the vending machines around campus?

Results

Based on previous research, it was hypothesized that subjects originating from the state of Minnesota would use the term "pop" and subjects originating from the state of Wisconsin would use the terms interchangeably, with "soda" being used more frequently. After conducting our research, it was determined that the subjects from the state of Wisconsin tended to use the term "soda" more frequently. Although the original hypothesis was that the terms would be used interchangeably by subjects from Wisconsin, "soda" was the only term used by these subjects. Subjects that originated from the state of Minnesota consistently used the term "pop" when referring to soft drinks. The term "soda" was not used by any subject from the state of Minnesota. Research confirmed that the information in the 2002 isogloss developed by Campbell and Plumb, found in Appendix A, was accurate in relation to the two states and the subjects' usage of the terms. See Table 1 for the results of our study.

Table 1

Frequency of Usage of the Terms "Pop" and "Soda" in Reference to Soft Drinks

Subjects	Origin	Pop	Soda
Subject 1	Ripon, WI	0	3
Subject 2	Wisconsin Rapids, WI	0	1
Subject 3	Richfield, MN	2	0
Subject 4	Verona, WI	0	1
Subject 5	Ladysmith, WI	0	1
Subject 6	Eagan, MN	1	0
Subject 7	Minnetonka, MN	1	0

While conducting research, subjects from both states also tended to use certain brand names to refer to soft drink brands. However, in no case did we find brand names being used generically for soft drinks, as has happened with "coke" in the American South. Figure 1 shows which brand names the subjects used during the course of the guided conversations. All subjects tended to name specific brands before using the terms "pop" and/or "soda" in reference to soft drinks.

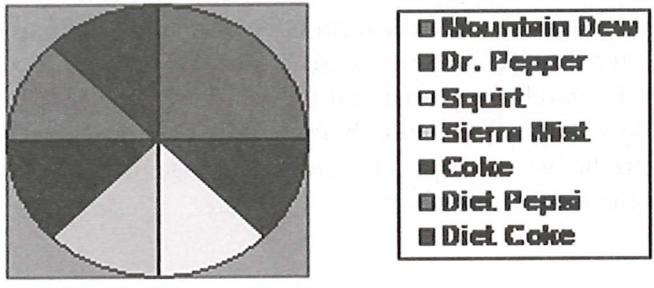

Figure 1. Use of Brand Name Terms in Reference to Soft Drinks

Conclusion

The findings of this research supports the original hypothesis that subjects originating from the state of Minnesota would use the term "pop," and subjects originating from the state of Wisconsin would use the term "soda." Results show that there is no shift in the isogloss for the terms "pop" and "soda" (Campbell & Plumb, 2002). The findings were consistent with the 2002 study regarding these terms found in Appendix A.

The initial hypothesis did not include evaluation of the use of brand names to reference soft drinks; however, findings have shown that subjects from both states used name specific brands when referring to soft drink brands. Over time, it is possible that certain brand names may be used generically to refer to soft drinks, as the term "coke" is currently used for this purpose in the American South.

Based on the findings of this study, it is hoped that other researchers will be inspired to further investigate the usage of the terms "pop" and "soda." In addition, we hope that future researchers will consider further investigation of the usage of brand names to reference soft drinks.

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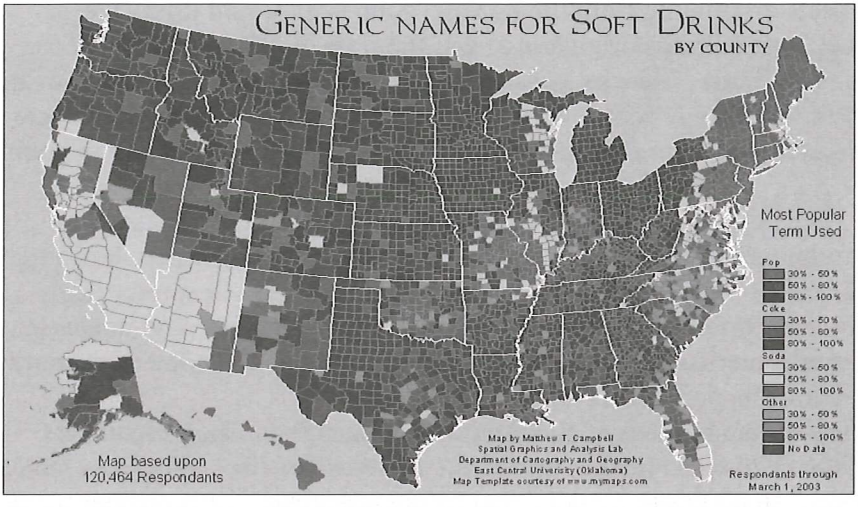
Appendix A



From Campbell and Plumb (2002)

Media Ideals... Unattainable to Most Females

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Key Words: Mass media, stereotypical representations, perceived body image, idealist representations

Abstract
The images of females displayed in the media today are thinner than the images of male, thinner than media images of females in the past, than the actual female population, and than the criteria for anorexia (Schooler, Ward, Merriwether, & Caruthers, 2004). This study investigated the stereotypical representations of adult females in mass media. It was hypothesized that exposure to mass media containing idealistic representations of the female body would be associated with less favorable body image evaluation among adult females. Results indicated a strong need for awareness and education regarding media images that carry forth ideas of such gender stereotypes throughout society. All participants reported having a higher level of body image dissatisfaction after viewing the mass media's ideal, which supported the hypothesis. Implications for practitioners indicate that awareness of media ideals and perceived body image versus the average healthy body needs to be more inclusive throughout a female's life.

Introduction

Females often aspire to be perfect when it comes to their physical appearance, and the perfect ideal is often described as tall, extremely thin, and blond (Schooler et al., 2004). Unfortunately, this ideal is unattainable to the vast majority of females, contributing to low self-esteem and body image. Feminist Theory states that awareness and removal of blinders is a continuous process rather than a one time step (Boss, Doherty, LaRossa, Schumm, & Steinmetz, 1993). Females have been marginalized by everyday experiences within society. The media heavily portrays females in stereotypical and "idealized" ways in regards to body image, and it has a profound impact on the female society. Media pressures to be thin influences females to have negative feelings about their appearance. The influence of media is the strongest predictor of overall body satisfaction in college females.

Research indicates that the ideal female body, as represented by media images, is currently between 13% and 19% below expected weight

for females (Engeln-Maddox, 2005). Stereotypical representations of the female body viewed in the media leads to a negatively perceived body image among females. For the purpose of this study, stereotypical representation refers to inappropriate, repetitive acts that are frequently displayed within the media or through group interactions (Turnbull, Turnbull, Shank, & Leal, 1999). Perceived body image refers to the awareness and perception of one's own body in relation to both appearance and function based on social norms (Champion & Furnham, 1999). Literature on mass media's stereotypical representations and the affects it has on female body image were examined.

Literature Review

In the process of researching the impact mass media has on the female body image through idealist depictions and imagery, it is important to assess studies that have looked in-depth at this population and the impact media has on many generations of males, females and children. After review, several articles regarding the negative impacts media has on female adolescent body image were found, but little research regarding adult females. Most research reviewed was from more recent years, suggesting that this issue has become more prevalent recently, possibly due to the increasing availability of mass media. In one study researchers distributed 2,500 questionnaires to students enrolled in eight high schools in the province of Nova Scotia, Canada. Body dissatisfaction typically is characterized as an issue faced predominantly by the female population. The case has been made that exposure to magazines and television programs containing idealistic body imagery as well as frequency of self-comparison to fashion models is becoming a widespread phenomena (Green & Pritchard, 2003). Indeed, the images of females displayed in the media today are thinner than the images of males, thinner than media images of females in the past, actual female population, and the criteria for anorexia (Schooler et al., 2004). Because few females can meet the beauty standards created by this ideal, dissatisfaction with one's own appearance is a likely outcome of this comparison process.

Based on the literature, mass media has impacted adult female's beliefs of themselves in regards to their body image. "Body image may be conceptualized as a multidimensional construct that represents how individuals think, feel, and behave with regard to their own physical attributes" (Morrison, Kalin, & Morrison, 2004). The studies investigated discussed the measures taken by females to look like the

"ideal" woman. The literature compared male and female adolescents in terms of physical traits including male- muscular, female- thinness, white females to females of color, and have further compared thinness of today to thinness of years past.

The "gap" this study intends to fill is that of the mass media's influence on adult female's body image. Previous researchers and past studies have not looked at adult females exclusively with regards to the media's stereotypical representations and perceived body image. Past studies have concentrated on the effects media has on female adolescents and adult males versus adult females, but not on how the media affects adult females (Engeln-Maddox, 2005). This research will contribute to the family social science by furthering its understanding of how the mass media's representations of the idealistic female affect adult females cognitively through their perceived body image.

Theoretical Framework

The theory used in this study was the Feminist Theory (Boss et al., 1993). Feminist Theory emerged as a result of political movements to end female's subordination with families as well as in other institutions, beginning in the late nineteenth century. Feminist theory suggests that the concept of cultural gender, defined as all of the learned and cultural phenomena loosely associated with biological gender, is socially constructed. Traditionally, females have been defined ideologically by cultural norms and gender. According to Feminist Theory, cultural or symbolic notions of gender determine what it means to be a male versus a female in a specific sociocultural context. Feminist Theory also suggests that sexuality is symbolically charged, deeply embedded in social institutions. It further suggests that it is culture that constructs the separated sex categories, "male and female" and gendered notions like "masculinity and femininity."

As applied to our study, this theory would predict that the mass media would have a negative impact on female college students, including how they view themselves in comparison to the stereotypical and idealistic images marketed within all aspects of the mass media. Based on Feminist Theory, it is predicted that the sample of female college students will exhibit attitudes based on socially constructed gender roles and stereotypes portrayed in the mass media, resulting in negative outcomes concerning body image. This prediction is based on the Feminist idea that gender is organized and symbolized. Idealized constructions of "masculine" and "feminine" have varied and changed

over time. Within the Feminist Theory it discusses that family and gender are assembled by society and taught throughout life.

Purpose Statement

The purpose of this study is to examine the research question: What is the relationship between exposure to mass media's stereotypical representations of women and how it influences the female student in relation to their perceived body image?

Methods

Participants

The site of this study was at a small Midwestern university. The participants were 63 female undergraduate students who were currently enrolled in a Human Development and Family Studies course. Of these 63 participants, 47 were between the ages of 18-21, 15 between the ages 22-25, and there was one participant in the 30+ age bracket. The academic status of the participants consisted of 17 sophomores, 25 juniors, and 21 seniors.

Research Design

The purpose of this study was to identify the adult female sample population's opinions and then use the data to generalize about a larger population of similar students on campus. The survey design type used was a cross-sectional study design in that it was used to capture adult female opinions from a cross section of the population at one point in time. The form of data collection was self-administered questionnaires. The rationale for using this method is that it was the most efficient method to gather data directly on campus due to the rapid nature of our research course; it was convenient, low cost, and allowed for quick return of data from participants. The study used a non-random probability sample design. Quota sampling was selected from a convenient location convenient, which consisted of three classrooms within the Home Economics building on the campus. The ethical protection of human subjects was provided by completing the Human Subjects Institutional Review Board (IRB) training; our study was approved by the IRB.

Data Collection Instrument

A survey was designed to measure the affects mass media has on adult female body image. The survey included a cover letter with an implied consent form which incorporated a description of the study,

definitions of any terms not commonly known, risks and benefits, time commitment, confidentiality, voluntary participation, and contact information of the research team and the supervisor as well as the instructions for completing the survey.

The survey consisted of three demographic questions relating to age, gender and academic status that were used as a basis to analyze the data. Participants were then given five close-ended statements based on a 5-point Likert scale which measured the intensity of the respondents' opinions from one (strongly disagree) to five (strongly agree). Questions were formed by the literature and theory regarding how one might describe themselves in relation to what is viewed in the media.

The survey instrument has both face and content validity. The statements addressed a broad range of issues regarding stereotypical deceptions of females in the mass media and the subsequent effects. To increase validity, the survey was piloted on four female undergraduate students who met the criteria of our study. Feedback indicated that the survey was clear and ready for further circulation.

Procedure

To collect the data we approached two professors on campus between October 24, 2006 and November 1, 2006 who taught classes in the major Human Development and Family Studies; we discussed our need to acquire volunteers for the survey. Our probability quota sampling design gave us the opportunity to survey all female undergraduate students within our proximity. After permission was granted, we began our sampling by entering each classroom and handing out surveys to all members of the class. We then introduced ourselves and our project and explained that we were only looking for female's input regarding this issue, but we would take the male perspective into account for our own knowledge and perhaps future research. It was stressed that all participants had to be 18 years or older to partake in the survey. Next, we read aloud the implied consent form as the students followed along, focusing on all vital information necessary to gather volunteers. We stated that this survey was completely voluntary and would only take about 5 minutes of their time. Before exiting the room willing participants were asked to place all finished surveys inside a manila envelope in front of the classroom. Both researchers and all professors exited the rooms while the participants completed the surveys to eliminate any distractions and pressures. After all participants had left, we reentered the room to collect the completed surveys that had been

securely sealed. All the surveys were then placed in a locked filing cabinet until data analysis.

Data Analysis Plan

The data was first "cleaned" and checked for missing data. The "cleaned" surveys were then "coded" using acronyms for each variable. The first three questions on the survey were demographic questions: academic status, gender and age. Each survey statement was a dependent variable and given an acronym name: To determine if body image dissatisfaction is common among college females *(COM)*, if college females want to look like the people they see in the media *(WNT)*, if college females judge their own attractiveness based on comparing themselves to images in the media *(JDG)*, if they frequently dwell on negatives thoughts about their own body *(DWL)*, and if they want to change something about their bodies after viewing females in the media *(CHG)*. To analyze the data, the data-analyzing computer program called Statistical Package for the Social Sciences (SPSS) was used. The individual was used as our level of analysis. The data analysis included frequencies and a reliability analysis: Chronbach's Alpha.

Results

All variables were subjected to frequency distribution analysis. Results indicated that there was no missing data. The Cronbach's Alpha measure of reliability in our analysis was .849.

Table 1

Frequencies

Variable	SD	D	U	A	SA	*Total*
COM	0.0%	5.0%	11.0%	41.0%	43.0%	100.0%
WNT	0.0%	9.0%	13.0%	54.0%	24.0%	100.0%
JDG	0.0%	6.0%	21.0%	48.0%	25.0%	100.0%
DWL	0.0%	13.0%	16.0%	44.0%	27.0%	100.0%
CHG	1.0%	8.0%	10.0%	48.0%	33.0%	100.0%

Note. (COM)=Body image dissatisfaction is common among college females; (WNT)=College females want to look like the people they see in movies, television shows and music videos; (JDG)=College females judge their own attractiveness based on comparing themselves with what they see in the media;

(DWL)=College females frequently dwell on negative thoughts about their own appearance after viewing other females in the media; (CHG)=College females want to change something about their bodies after viewing other females in the media.

Discussion

Survey results strongly supported the hypothesis that exposure to mass media containing idealistic representations of the female body was associated with less favorable body image evaluation among adult females. Results showed that the majority of respondents strongly agreed that body image dissatisfaction is common among college females, which is evident in the literature as well (Engeln-Maddox, 2005). Most respondents strongly agreed that college females want to look like the people they see on movies, television shows, and music videos (Green & Pritchard, 2003). The majority of females desire a thinner physique, the typed viewed in the media on a daily basis. Seventy-three percent of participants agreed that college female's judge their own attractiveness based on comparing themselves with what they see in the media (Schooler et al., 2004). Mass media is believed to play an important role in perpetuating this ultra thin ideal for females. According to Morrison et al. (2004), females who believe fashion magazines are important sources of beauty and fitness information were more likely to dwell on negative aspects of their appearance. This finding was strongly associated with the majority of respondents. The final survey statements concluded that the vast majority of participants strongly agreed that college females want to change something about their bodies after viewing other females in the media; this too is highlighted in the literature (Engeln-Maddox, 2005).

The findings strongly relate to the Feminist Theory in that it suggests that sexuality is symbolically charged and deeply embedded in social institutions, which is evident in all the survey statements. In other words, it is impossible to avoid comparing oneself to the images repeatedly bombarded with. Based on Feminist Theory, our sample group of female college students displayed attitudes that are based on socially constructed gender roles and stereotypes portrayed in the mass media (Boss et al., 1993).

Interestingly, as we examined the qualitative comments in relation to the survey statements and hypothesis, respondents revealed they not only evaluate themselves with images in the media, but in opposition with their peers as well. Some of the adult females even carried the notion that

they must conform to what males find attractive based on the imagery in the media.

Limitations

Some limitations were evident within our study. There was a lack of diversity within the adult female population, not only in ethnic groups, but within age groups as well. A more representative sample would have included equal numbers of each age group. Being that adult females were surveyed, we should have expanded our survey to include the faculty and staff of the University.

Implications for Practitioners

The results showed that there is a need to educate society regarding the devastating effects the mass media has on females alike. It is our hope that the results from this study will be used by the college community as a whole. It is important for females to realize that they should not feel obligated to conform to the stereotypical and idealistic ways set forth in the media. The trend in today's society is to view females in idealistic ways, encouraging them to believe they must conform to these images in order to feel worthy. This issue can be discussed through the campus counseling center, through interactions with advisors and RA's, and dispersed through the college curriculum. Faculty and staff can use the information from this study to inform students and surrounding communities of the hidden messages within the mass media, how females are negatively affected by these stereotypical depictions of the ideal female body that for most is unattainable.

It is important to provide female students with information that focuses on positive self identity, self-esteem and body image, especially at a time when they are exploring the world and figuring out who they truly are as a person. The Human Development and Family Studies major houses classes that discuss such topics; making some of these courses required for graduation would promote a stable starting point for females as they attempt to uncover the hidden agendas of the mass media. As family scholars, through education and counseling; we can address issues to construct a more realistic and healthy self-image for female which will in turn strengthen future generations.

Implications for Future Research

For future research we would propose looking at how peer groups influence one another concerning body image issues. We would also

suggest incorporating males into a future study regarding media and body image, because they too are impacted by the stereotypical images embedded in the media

Conclusion

This study helped to fill in a small gap within the Family Social Science research by helping to uncover some devastating information regarding the feminine ideal that is embedded so deeply within the mass media that consumes society and sets standards. Overall, participants reported having a higher level of body image dissatisfaction after viewing the mass media's ideal. This research is significant to the field of Family Studies because it is a community wide issue that affects not only the individual, but the family system.

This ideal media standard can lead to instability in the form of family disagreements, eating disorders, negative body image and daily disruptions. Results indicated a strong need for awareness and education regarding media images that carry forth the ideas of such gender stereotypes throughout society. Television advertising is a large scale money making industry, and we hope that individuals recognize the ways television targets audiences for the simple purpose of creating an even bigger industry. With this awareness, we hope that people will become conscientious and rebel against the conformities and idealisms set forth by the mass media. The danger in not doing this could be detrimental to the approaching generations of females.

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College Students' Attitudes towards Eating Disorders in Males

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Key Words: Male eating disorders, college males, men's attitudes

Abstract
Eating disorders are a prevalent and serious health problem in the United States. Eating disorders are generally associated with young women. However, people are less aware of eating disorders among male; thus, there are fewer studies done on this issue and fewer eating disorder prevention programs for males. This study investigates men's attitudes regarding awareness and knowledge of eating disorders in males by surveying a sample of 28 male students on campus. It was hypothesized that college males would have little knowledge about male eating disorders and less awareness of it being a problem among males. The findings support the hypothesis that college males do not have a clear understanding of male eating disorders.

Introduction

There are significantly higher rates of suicide attempts, depression, and anxiety among males with eating disorders (Bromon-Bosch, Troop, & Treasure, 2000). However, people are less aware of eating disorders among males and there are less preventive programs for males with eating disorders. According to Eliot and Baker (2001) there is a belief of eating disorders to be a female problem, which leads to misdiagnosis and silence among males who suffer. Although there are findings supporting the prevalence and severity of male eating disorders, American society is still holding to the belief that eating disorders are a female problem and these beliefs need to change. For the purpose of this study, Eating Disorders: "Are characterized by severe disturbances in eating behavior; two specific diagnoses include, Anorexia Nervosa and Bulimia Nervosa" (DSM-IV-TR, 2000). Anorexia Nervosa: "The essential features of Anorexia Nervosa are that the individual refuses to maintain a minimally normal body weight, is intensely afraid of gaining weight, and exhibits a significant disturbance in the perception of the shape or size of his or her body" (DSM-IV-TR, 2000). Bulimia Nervosa: "The essential features of Bulimia Nervosa are binge eating and inappropriate compensatory methods to prevent weight gain" (DSM-IV-TR, 2000).

Literature Review

In researching articles on the attitudes men have towards eating disorders in males, the main theme was that eating disorders in males are just as prevalent as in females. However, in researching the problem, there was little information or studies conducted on male eating disorders and fewer done in the United States. European countries appear to be ahead of the United States in their acceptance of male eating disorders and action that has been taken in providing awareness of this growing problem. International findings concur that males and females suffer similarly from eating disorders and that there is no difference in the degree of severity (Bromon-Bosch et al., 2000; Eliot & Baker, 2001; Philpott & Sheppard, 1998; Tata, Fox, & Cooper, 2001).

Bromon-Bosch et al. (2000) studied an equal sample of male and female patients in a hospital program for victims of eating disorders to research if there are any gender differences. Overall, the research findings show that there were no differences in the degree of severity between males and females that suffer from eating disorders. Interestingly, males in the study had significantly higher rates of suicidal attempts, depression, and anxiety in comparison to the females. Eliot and Baker (2001) found that the similarity between adolescent females and males suffering from eating disorders was significant. Researchers expressed a need for more information to be provided to males about eating disorders as well as encouraging males to discuss their struggles and thoughts regarding body image and disordered eating. Philpott and Sheppard (1998) conducted a study on adult males who had previously suffered from eating disorders and went through therapy. This study gave men the opportunity to talk freely about their personal struggle and emphasized the need to get rid of stereotypes surrounding eating disorders as well as more focus on an individual approach. Tata et al. (2001) focused their study on gender differences related to excessive exercise, eating disorders, and the difference between the ideal body image projected for males and females. They found an equal pressure for an ideal body type between males and females.

Based on the literature, it appears that eating disorders are just as prevalent and severe in males as in females. One gap in the literature, addressed by our study, is further United States perspectives on understanding the prevalence of male eating disorders and the need for treatment and prevention.

Theoretical Framework

The theory employed in this study is the Family Ecology Theory (Strong, DeVault, & Cohen, 2005) which focuses on how people's environments affect them developmentally, from family environment to the greater cultural environment.

As applied to this study, this theory would predict that men will have little knowledge about male eating disorders and be less aware that it is even a problem among males because society has influenced their perception of an eating disorder as being a female problem. The idea that eating disorders are a female problem may be due in part to how much the media projects an idea of the perfect female body. However, what is overlooked is that men are also bombarded by the media projecting an ideal male body (Vartanian & Giant, 2001).

Purpose Statement

The purpose of this study was to examine the central research question, "What are the attitudes college men have towards eating disorders in males." It was hypothesized that men would agree that there is little knowledge or help for males with eating disorders. This hypothesis was based on findings that eating disorders are a female problem (Eliot & Baker, 2001).

Methods

Participants

This study took place at a Midwestern university. The participants were 28 male students with varying status, age and majors. Participants included nine freshmen, seven sophomores, six juniors and six seniors; there were no graduate students that participated in this study. The age of participants ranged from age 18 - 24. The participants were students of a variety of majors including: Eight in General Business Administration, six in Construction, two in Graphic Communications Management, two in Hotel-Restaurant and Tourism Management, one in Applied Science, one in Early Childhood Education, one in Engineering Technology, one in Golf Enterprise Management, one in Graphic Design, one in Industrial Design, one in Information Technology Management, one in Manufacturing Engineering and one in Retail Merchandising and Management.

Research Design

This study could be best described as a non-random probability

quota design because we used a location that was convenient and had the limitation of requiring the subjects to be male college students. For convenience, ease of access, and cost, self-administered questionnaires were given to all respondents found in the Student Center. This study design was cross-sectional, collecting data at one point in time.

Data Collection Instrument

The data collection instrument was created by the research team and was approved by the Institutional Review Board (IRB). The survey instrument was preceded by a cover letter stating the following: an introduction of the team doing the research and the program and supervisor of the research, the purpose of the study, definitions of terms important in assisting the participants in completing the survey, instructions for completing the survey, a statement affirming that participation is voluntary and a declaration assuring the confidentiality of all responses, concluding with a statement of appreciation to participants for their involvement.

The survey included three demographic variables: status, age, and major. Eight questions, inspired by the literature and theory, relating to male eating disorders followed. The first question (MED) asked whether society believes males struggle with eating disorders and the second question (MPB) asked whether the media places pressure on males to have the "perfect" male body. The third question (MOT) asked whether males with eating disorders openly talk about it. The fourth question (IPD) asked whether males are impacted physically to the same degree as females. The fifth question (IPSD) asked whether males are impacted psychologically to the same degree as females. The sixth question (ACW) asked whether athletes use eating disorder behavior to control their weight. The seventh question (CAD) follows up the sixth question by asking if coaches are aware of male eating disorders. The eighth question (PHP) asked if there is professional help provided for males with eating disorders. The eight questions were based on a 5-point Likert scale with potential responses: 1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, and 5 = strongly agree. The survey instrument in this study has both face validity and content validity.

Procedure

On March 9, 2006, our research team sat at a table located next to the cafeteria in the Student Center and asked male students if they would be willing to complete a survey. Randomization was not utilized

due to time constraints and the need for every willing participant. The 28 surveys administered were completed in the presence of our research team and the surveys placed in a folder.

Data Analysis Plan

In an effort to ensure data validity, research was "cleaned" and "coded." No surveys were found to be missing data. "Cleaned" surveys were then "coded" using acronyms for each variable. The research team created a code book, assigning a name to each variable and a number to each of the potential responses to the questions.

To analyze the data, the computer program Statistical Package for the Social Sciences (SPSS) was employed to analyze the dependent variables. Frequencies were looked at and a reliability analysis run to determine whether or not the survey's variables measured what they were intended to measure.

Results

Frequency analysis indicated that there was no missing data.

Table 1

I am Equipped with the Computer Technology I Need to Work Efficiently in my Classroom

Variable	SD	D	U	A	SA	Total
MED	39.3%	46.4%	7.1%	7.1%	0.0%	100%
MPB	3.6%	42.9%	32.1%	17.9%	3.6%	100%
MOT	46.4%	35.7%	14.3%	0.0%	3.6%	100%
IPD	28.6%	21.4%	28.6%	17.9%	3.6%	100%
IPSD	14.3%	39.3%	14.3%	28.6%	3.6%	100%
ACW	3.6%	14.3%	17.9%	57.1%	7.1%	100%
CAD	3.6%	28.6%	21.4%	42.9%	3.6%	100%
PHP	10.7%	46.4%	0.0%	25%	17.9%	100%

Note. (MED) = Society believes males struggle with eating disorders; (MPB) = The media places pressure on males to have the "perfect" male body; (MOT) = Males with eating disorders openly talk about it; (IPD) = Males are impacted physically to the same degree as females; (IPSD) = Males are impacted

psychologically to the same degree as females; (ACW) = Athletes use eating disorder behavior to control their weight; (CAD) = Coaches are aware of male eating disorders; (PHP) = There is professional help for males with eating disorders.

The Chronbach's Alpha reliability analysis was 0.554. This value indicates that the survey questions aren't as a reliable measure of male students' attitudes towards male eating disorders as hoped; however, the Chronbach's Alpha would be 0.641 if the item ACW was deleted.

Discussion

Overall, the results supported the hypothesis that male students agreed there is little knowledge or help available for males with eating disorders. This finding is supported in the literature (Eliot & Baker, 2001). Interestingly, results showed that more respondents disagreed that the media places pressure on males to have the "perfect" male body, in opposition to literature (Giant, Carrie, Vartanian, & Lesa, 2001). A majority of respondents disagreed that males with eating disorders openly talk about it, which supports findings in the literature stating that there is a need for males to be encouraged to talk about it (Eliot & Baker, 2001; Philpott & Sheppard, 1998). Fewer men agreed that males are impacted physically to the same degree as females. The majority disagreed that males are impacted psychologically to the same degree as females. According to Bromon-Bosch et al. (2000), eating disorders are almost more psychologically damaging to males because males have significantly higher rates of suicidal attempts, depression, and anxiety in comparison to females. Concerning the question of athletes using eating disorder behavior to control their weight, the majority agreed. According to Tata et al. (2001) males excessively exercise more than females to control their weight however; this is not always seen as a form of an eating disorder. For the question, "coaches are aware of male eating disorders," almost half agreed that coaches are aware of male eating disorders. This could relate back to the Family Ecology Theory in that even though coaches may know that male athletes struggle with eating disorders they still may not employ preventive cautions because of the popular belief that eating disorders are primarily a female problem. The final question "there is professional help provided for males with eating disorders" showed that the majority of respondents disagreed that there is professional help provided for males with eating disorders. This was not surprising because according to the literature there is a need for more

information to be provided to males about eating disorders (Eliot & Baker, 2001).

Limitations

The small sample size limits the ability to generalize and compare to the larger population male students and to society as well. An additional limitation was the inability to randomize the survey collection due to time constraints and the number of willing participants.

Implications for Practitioners

Results showed that there is a great need to inform society that males struggle with eating disorders. This is something that can be done in health classes, parent teacher meetings, and athletics in middle school and high school. This can also be done in colleges through health courses, specialized programs, campus support groups and programs, and informative materials such as pamphlets, articles, brochures and counseling services. Doing this will reach people at a young age and provide more professional help and resources for both males and females young and old. There needs to be specialized training for professionals such as doctors, nurses, nutritionists, and counselors in mental health and family therapy treating male victims of eating disorders. The specialized training specific to males is important because males with eating disorders have an additional, different set of potential struggles because of the stigma that eating disorders are a female problem which results in less acceptance and understanding of the issue.

Implications for Future Research

It is recommended that the next step of research be conduct more studies in the United States using larger, more diverse samples. If this study was to be replicated we would suggest either rewording or discarding one of the statements (ACW); that athletes use eating disorder behavior to control their weight. According to our reliability statistics, the Cronbach's Alpha would increase from 0.554 to 0.641 if the question (ACW) were taken out of the survey. We believe this is because it is the only statement that is not specific to male eating disorders.

Conclusion

As a result of this study, it is hoped that male eating disorders will be recognized as an issue that needs to be studied and addressed in college courses, hospitals, counseling centers, schools, and in sports/fitness.

People need to recognize that the belief that eating disorders are only a female problem is a stereotype and that it is possible for males to struggle with eating disorders and body image. As a result of this study, it is hoped that action is taken to gain a better knowledge of how males with eating disorders suffer and recover from this disorder so that the proper prevention and treatment can be provided to males.

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Japan's Recycling: More Efficient than U.S.A

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Abstract
Recycling plays a major role in global society. Waste is a big issue and countries are struggling with ways to keep the situation under control. Japan is a model country in terms of recycling. Their efforts have surpassed many countries. Japan has recently passed a number of laws that have helped the country's recycling issues. These laws have produced tremendous results in Japan's favor. Through enforcement of these laws the country sends only 16% of its solid waste to landfills. The United States sends close t0 70% to landfills. Consumer recycling in Japan is much more advanced than the United States. Waste is separated into categories to maximize the recycling process and to minimize waste sent to landfills. The U.S. should be modeling their recycling efforts toward the Japan recycling model.

Introduction

As the Worlds population continues to grow at a dramatic pace, consumers are producing more waste. According to the Environmental Protection Agency (EPA), the average U.S. citizen produced 4.4 pounds of waste per day during 2000. This is the equivalent of over 1,600 pounds of trash per year per person or more than 220 tons of waste being generated each year (Onorato, 2001).

There are many sources of trash including bottles, boxes, cans, yard trimmings, grass clippings, furniture, clothing, newspapers, and much more. Americans also dispose of several million tons of tires, appliances, furniture, paper, clothing, and other durable and non-durable goods each year. Packaging waste, including glass, aluminum, plastics, metals, paper, and paperboard also contributes significantly to annual waste totals. Even yard trimmings, such as grass clippings and tree limbs, are a substantial part of what is thrown away.

An estimate of the type and percentage of waste products can be seen in Figure 1. With an abundance of waste being produced by a growing population this is where recycling comes into play.

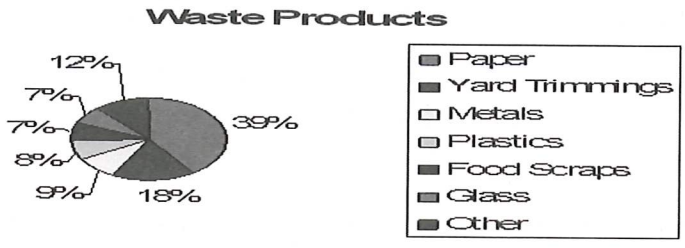


Figure 1. Percentage of waste products reported by the EPA

Recycling plays a major role in today's global society. Over the past twenty years, concern about the environment has brought with it a massive increase in recycling. In Japan, recycling rates are much higher than those of the United States: Approximately 50% of solid wastes are recycled in Japan, compared to about 30% in the United States (EconEdLink, n.d.). The table below represents recycling activities in eleven different countries. The countries were rated on a scale of one to eleven in a number of different categories. The lowest number total is desired.

Consumer Recycling is More Refined in Japan

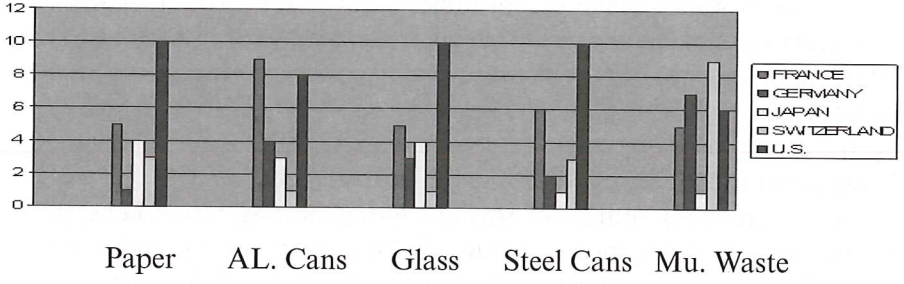
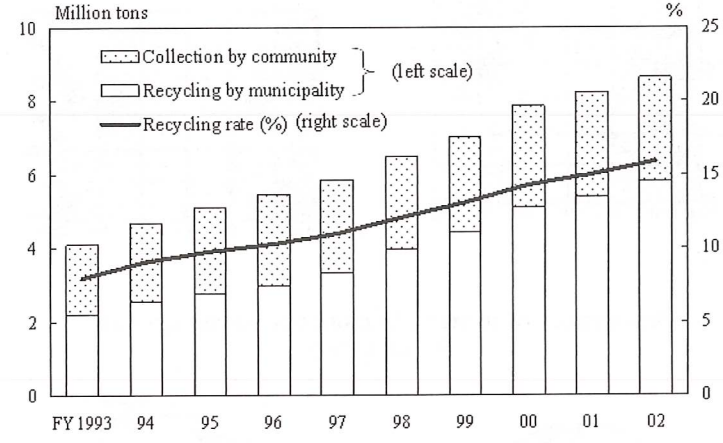


Figure 2. Comparison of Japan to other countries' recycling materials (Kim, 2004)

According to Figure 2, Japan is the most efficient in terms of recycling. Japanese trash pickup is handled very differently than in the U.S. Instead of once a week, it is picked up almost daily. There are three main types of garbage which must be separated completely from each other: burnable, non-burnable, and recyclables. Non burnable includes pieces of metal or glass, china, rubber, Styrofoam and plastic packages or wrappings, plastic 'pet' bottles, shampoo bottles, and the like. Burnable includes regular household trash such as paper, diapers, clothes, wood,

food waste, and so on. Food waste should preferably be put in a plastic bag (such as those from convenience stores or supermarkets) and tied up before being thrown away. The plastic bag keeps the smell of the garbage from attracting flies or scavenging animals such as crows or stray cats, which rip open bags in search for food. Recyclables include cans and bottles; these should be rinsed out before being placed in the garbage, again to avoid attracting pests. Residents are responsible for sorting their waste and for peeling off labels from bottles and containers. Trash is left out in clear plastic bags, not trash cans. The bags must be clear, or semi-transparent; to assure that the trash is of the right type for that day's pickup. People do not leave the trash out in front of their own residence, but rather at one of several trash pickup points available on every block (Onorato, 2001).



$$\text{Recycling rate (\%)} = \frac{\text{Total amount of material recycled}}{\text{Total amount of processed waste} + \text{Amount of collection by community}} \times 100$$

$$\text{Total amount of material recycled} = \text{Amount of recycling by municipality} + \text{Amount of collection by community}$$

Figure 3. Recycling of Residential Waste
(Ministry of the Environment, 2002)

Figure 3 represents Japan's recycling rate over a nine year period. Within nine years the percentage quadrupled. The new recycling laws play a dramatic role in the increase.

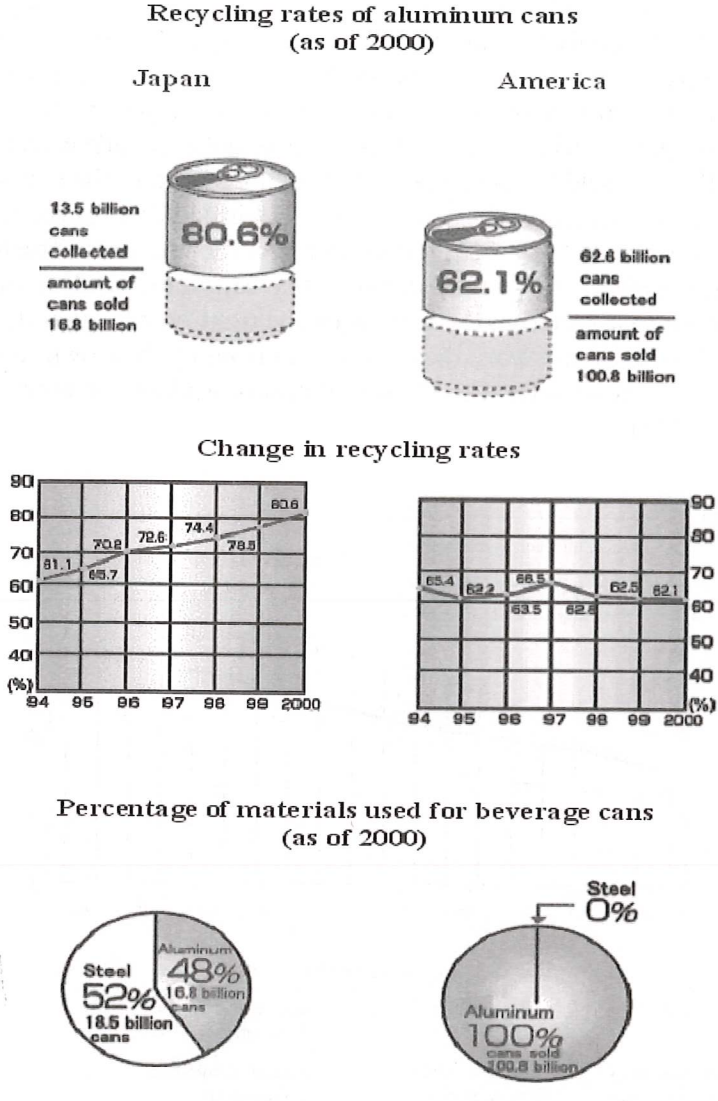


Figure 4. Recycling rates of aluminum cans (for beverages) in Japan and the USA as of 2000 (Isao, 2002)

Figure 4 represents materials used for beverage cans in the United States and Japan. The Japanese recycle 100% of beverage cans, while the United States recycles about 48% (Isao,2002). If the United States switched all beverage cans to Aluminum that would save a substantial amount of waste that would be diverted into the landfills.

Laws and Regulations Enforcing Recycling

The Japanese are very efficient in recycling. There are strict laws in place and the people have a great sense of stewardship for the land. One such law is Japan's Home Appliance Recycling Law, which came into effect in April 2001. The law covers four major types of home appliances: televisions, refrigerators, washing machines and air conditioners. The law is intended to promote the recycling of useful parts and reduces the amount of unwanted household appliances in local landfills (Sony, n.d.).

In accordance with the law:

- Consumers pay a recycling fee when disposing of home appliances
- Retailers take back discarded appliances and pass them on to manufacturers
- Manufacturers recycle discarded appliances thus retrieved

The issue, in this case, is who bears the cost of recycling (Onorato, 2001). When producers are "billed first" for the cost of recycling, the incentives encourage them to make an investment in plant and equipment, enabling them to build appliances that are easier to recycle. Costs of production increase and the supply curve for this industry shifts upward and to the left.

On the other hand, when consumers are billed first, the incentives encourage consumers to purchase durable goods less frequently and to rely less frequently on illegal dumping aimed at avoidance of the disposal fee. The demand curve for appliances then shifts downward and to the left. In either case, the result is fewer new appliances sold and fewer appliances dumped in landfills. Sony has established a nationwide cooperative recycling network with five other manufacturers. Consequently, Sony-manufactured televisions are now recycled at 15 recycling plants across Japan. Sony is the principal shareholder of one of the 15 plants: Green Cycle Corporation in Aichi Prefecture. In fiscal 2004, approximately 570,000 Sony-manufactured televisions were recycled (Sony, n.d.).

The Home Appliance Recycling Law requires the recycling of at least 55% of televisions. Sony has consistently achieved this requirement since fiscal 2001. In fiscal 2004, the recycling rate for Sony-manufactured televisions was 86% (Sony, n.d.). The Recycling Research Center (established by Sony in October 1997) and Green Cycle, cooperate to

conduct research on the state of recycling in Japan. Feedback from such research helps television designers and engineers create new products that are easier to recycle.

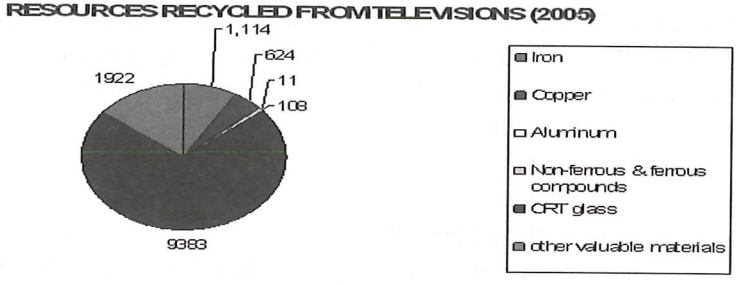


Figure 5. Numbers are in tons (Plastic Waste Management Institute, 2006).

Television Recycling in Japan

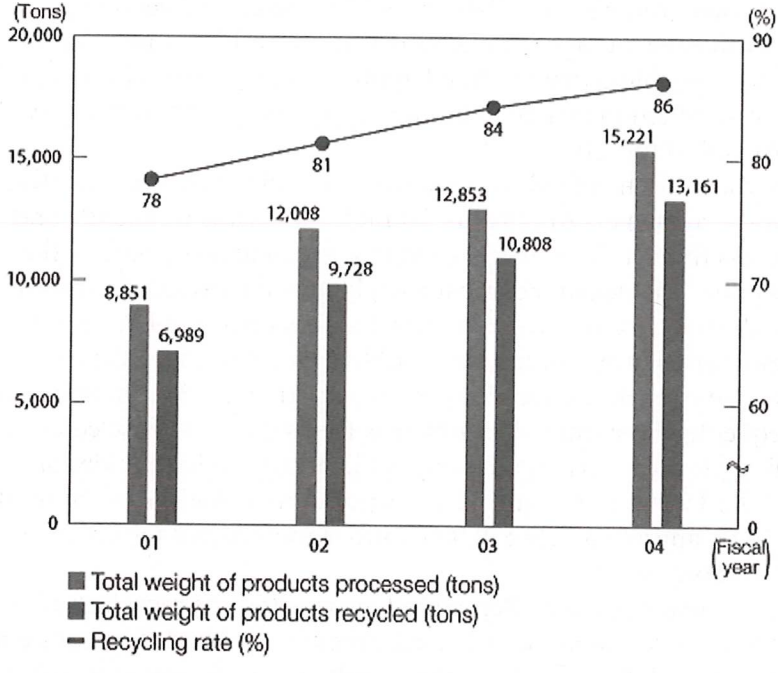


Figure 6. Represents different materials and televisions recycled in Japan (The Japan Containers and Packaging Recycling Association).

A second law that went into effect in Japan is the Automobile Recycling Law of 2005. Japanese auto makers face more competition to produce eco-friendly cars, requiring manufacturers to charge drivers for the recycling of their vehicles. Car owners are to pay about 7,000 to 18,000 yen ($65 to $166) per disposed vehicle, according to the government's latest estimates, to cover the recycling of chlorofluorocarbons (CFCs), a harmful gas used in air conditioners, airbags and automobile shredder residue (ASR) (Kim, 2004).

The law is part of the government's solution to meet the rising cost of disposing of car-related scrap as landfill sites become scarce. Japan is also aiming to raise the recycling rate for cars to 95 percent by 2015, from around 80 percent now (Kim, 2004). Because the fees would differ from model to model depending largely on the amount of waste produced, carmakers are under pressure to come up with ways to keep them down, thereby attracting cost-conscious customers. Toru Tohata, general manager of Nissan Motor Co. recycling promotion department said "we would try to bring down the fee by coming up with the best materials to use for various parts at the design stage, as well as by developing ways to incinerate ASR and reuse the energy produced" (Kim, 2004, ¶ 4).

In Japan, the volume of municipal solid waste discharged has increased. The volume of containers and packaging has become approximately 60% of the total municipal solid waste. As a result, a third law that was enacted: The Container and Packaging Recycling law. This law reduces the waste of glass containers, PET bottles containing drink or soy sauce and paper cartons (except for those cartons applying aluminum foil inside). The law promotes efficient use of recycled containers and packages generated and reduction of waste by shifting those wastes into recyclable resources (The Japan Containers and Packaging Recycling Association, n.d.).

Japan Saves Space with fewer Landfills

Wastes that cannot be recycled or incinerated are sent to landfills. A secure landfill is a carefully engineered depression in the ground (or built on top of the ground, resembling a football stadium) where wastes are put. The aim is to avoid any hydraulic [water-related] contact between the wastes and the surrounding environment, particularly groundwater. There are four critical elements in a secure landfill; a bottom liner, a leachate collection system, a cover, and the natural landscape setting. The landscape setting can be selected to minimize the possibility of wastes escaping to groundwater beneath a landfill. The three other elements

must be engineered. Each of these elements is critical to success.

Conclusion

Recycling plays a major role in today's global society and Japan's recycling is leading the nation. The country has passed rigid laws to control the waste issue in their country. On the consumer level, Japan's citizens follow very strict recycling guidelines at home. Waste is picked up on a daily basis and trash is separated and most of it is recycled.

Landfill use is at a bare minimum in Japan. The country has a small landmass, with a big population. They have to be very careful in what goes into the landfill. Only 16% of waste is sent to the landfill in Japan versus 70% in the United States. The United States needs to pass rigid laws and model their recycling efforts after Japan. As time goes on, the waste issue will get worse and it is just a matter of time until this issue is going to present a very big problem for the United States. Hopefully the United States can someday be on the same level as Japan in the recycling arena.

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Effects of Domestic Versus Exotic Animals on Stress Reduction

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Abstract
The use of animals as a therapeutic tool is becoming a more widely studied concept. Researches are finding that animals tend to have positive effects on people. The effect of animal pictures on stress reduction was examined on 65 undergraduate and graduate students. Participants took a timed, stress inducing, mathematical exam and then viewed a short slideshow presentation of animal pictures. Upon completion of the presentation participants filled out a likert-scale State-Trait Anxiety Inventory. The slideshow participants viewed entailed one of four conditions: domestic adult animals, domestic juvenile animals, exotic adult animals, and exotic juvenile animals. Results showed that the level of stress was not affected by the independent variables. Overall, the mean level of stress varied a minuscule between each condition.

Introduction

Animal assisted therapy is a relatively new concept that has recently received attention by the research community. Many studies conducted have researched the benefits animals have on people both individually and socially. Pets serve as companions. Not only do they assist in the interactions between people, but they also benefit individualistic qualities of a person (Brickel, 1981). Physical, pet interaction has been found to lower blood pressure and heart rates (DeMello, 1999). Pets also encourage individuals to physically play with them, which is a great source of exercise. In addition, pets aide in the fulfillment of the psychological needs of individuals. Pet ownership gives individuals a sense of responsibility and induces higher self-esteem (Brickel, 1981). Animals, especially dogs, are known for their unconditional love, which is often the support a person needs after a long day. They can be a nice distraction from the world and daily issues. It has been reported that the physical presence of an animal can ease the processes of expressing difficult feelings (Brickel, 1981). This was the case for an individual whom had become self-isolated and silent for over twenty-five years. A therapist brought in a dog at which time the individual spoke, "you brought a dog." He subsequently broke out of his shell and began to draw pictures of dogs and display the pictures (Brickel, 1981, p.122).

Many studies that look at the effects of animals on people use the participant's autonomic responses as a means of measurement. For example, researchers commonly measure blood pressure, heart rate and perspiration (Allen, Blascovich, Tomaka & Kelsey, 1991; DeMello, 1999; Eddy, 1996). However, other studies have used interviews and surveys to assess psychological health (Seigel, 1990; Straede & Gates, 1993). A self-reported stress measure was utilized in this study based on the constraints of time and money.

There have been significant findings on the differences between being able to see an animal and being able to touch the animal. The current study uses pictures as the stimuli instead of having an animal present. This adds a completely new realm to the previously explained studies in that did not merely use pictures, but had an animal physically present.

The majority of studies have focused on how one type of animal reduced stress. The most commonly used animal is a dog, which was the case in research conducted by Allen et al. (1991). Their study measured blood pressure, heart rate and skin conductance of participants while they performed a stressful task. While performing this task, participants were either alone or had a friend or dog present. Results showed that participants with a friend present demonstrated the highest levels of anxiety whereas those that had a dog present showed the least amount. This may be due in part to a dog's non-evaluative support. In other words, when another person watched while performing a task, even a close friend, the person performing the task may be concerned with the other person's judgment of his or her performance. When only an animal is present, this concern is eliminated (Allen et al., 1991). A different study found that cats, another common pet, provide psychological benefits (e.g. a sense of companionship) to their owners (Strade & Gates, 1993).

While research has generally focused on common household pets such as cats and dogs, there are examples of research on slightly more exotic pets. For example, Eddy (1996) used measurements of heart rate and blood pressure to determine level of arousal in one of three situations. The participant was simply asked to relax in one condition, which showed the highest levels of blood pressure and heart rate. In another condition, the participant was able to see his pet snake. In the third condition, where the participant's heart rate and blood pressure were the lowest, the participant was able to hold and pet the reptile (Eddy, 1996). This suggests that perhaps it is not the type of animal but rather the strength of the bond between animal and owner.

In all these studies, researchers only used one type of animal per

study. Siegel's (1990) research differed from these in that it surveyed an elderly population to determine the effects of pet ownership. He found that pet owners in general had fewer patient initiated doctor visits. Among non-pet owners, Siegel discovered a relationship between highly stressful life events and number of doctor visits. This correlation was not present among the pet owning population. He also found that dogs more than any other type of animal provided the most positive effects, which is most likely attributed to the type of companionship and attachment with this pet.

The current study focuses on the effects of the type of animal, domestic or exotic, on an individual's level of stress. The underlying implication from previous research is that stress reduction occurs due to the familiarity and bond with the animal. Little research conducted looked at the effects of unfamiliar animals on stress reduction (DeMello, 1999). The present study is designed to examine whether either domestic or exotic animals induce greater stress reduction. The age of the animal (juvenile vs. exotic) will also be manipulated.

Animals are usually physically present during studies, but this study will focus on whether pictures are a strong enough presence to induce similar effects as opposed to when an animal is physically present. It is hypothesized that juvenile domestic animals will be correlated with the lowest stress scores followed by domestic adult animals. The highest stress scores will occur in the condition viewing adult exotic animals.

Method

Participants

Participants were 65 undergraduate and graduate students from the University of Wisconsin – Stout (39 females, 24 males, and 2 who did not identify sex). Participation in this study was strictly voluntary. Students were able to sign up via a sign up sheet that was presented during class periods. Some participants received class credit for their participation.

Materials

A math test was used to induce stress in participants. The math test was created using two arithmetic books from the UW- Stout. The test was designed to challenge participants, so it was nearly impossible for anyone to finish the test in the allotted time.

The media presentations consisted of various animal pictures extracted from internet websites. In the domestic condition, pictures of cats, dogs and rabbits were shown. Pictures of less familiar animals

such as, red pandas, lemurs and capybaras (see Appendix A) were used in the exotic condition. All pictures were of a single animal with neutral backgrounds.

The State-Trait Anxiety Inventory (Spielberger, 1977) was used to measure participant stress. This assessment includes a series of questions assessing the participant's level of anxiety based on a 4-point Likert-scale (1 = Not at all; 2 = Somewhat; 3 = Moderately so; 4 = Very much so).

Procedures

This study was conducted in a computer lab, so each participant had a chair and computer at their station. The number of participants used at a time varied from one to nine. Computers were positioned so participants could only view their computer screen. Upon arrival, participants were randomly assigned to a computer station. They were then given an informed consent and asked to read, sign and date it. The researcher collected the signed informed consent while passing out the math test face down. Participants were instructed to flip over the test and read the instructions at the top of the page stating that they had three minutes to complete the test and not to start until instructed to do so. Participants were given several seconds to read the instructions before the researcher informed them the test time was beginning. After three minutes passed, participants were told that time was up and to direct their attention to the computer screen where Windows Media Player was minimized on the task bar. All computers were set up to display a slide show of animal pictures. Participants viewed one of four slideshows with photos of either domestic adult animals, domestic juvenile animals, exotic adult animals or exotic juvenile animals. Participants were instructed to click on the program, push play and view the slideshow in its entirety. Each slideshow consisted of 20 images, and each image displayed for approximately 6 seconds. After watching the slide show, participants completed the State-Trait Anxiety Inventory. They were then given the debriefing form and thanked for their participation in the study. The researcher wrote either an A, B, C or D on the assessment to signify which slide show they viewed.

Results

The State-Trait Anxiety Inventory is made up of 40 statements total, half of these statements reflected feelings of relaxation. These items were reversed scored to get an overall measure of the participants' level

of stress. To confirm the reliability of the State-Trait Anxiety Inventory, internal consistency was tested using Cronbach's alpha. The measure was highly reliable, ⊠ = .879. Because the scores were highly related, an average stress composite score was created by averaging the items. One participant failed to answer one question on the stress measure. However, rather than eliminating this participant's data, an average was created from the remaining thirty-nine questions.

To determine whether stress was reduced by viewing the animal pictures stress scores were analyzed using a 2 (Type of Animal: domestic vs. exotic) x 2 (Age of Animal: adult vs. juvenile) between-subjects ANOVA. There was no main effect for Type of Animal, $F(1, 61) = .681$, $p = .414$. There was also no main effect for Age of Animal, $F(1, 61) = .199$, $p = .659$. In addition, the Type of Animal x Age of Animal interaction was not significant, $F(1, 61) = .645$, $p = .426$.

Discussion and Conclusion

It was hypothesized that participants that viewed the slideshow consisting of juvenile domestic animals would show the lowest stress levels. However, the results of this study suggest that stress reduction does not vary with the animal's age or species. Participant's average score on the stress inventory was approximately 2 for every condition. On the likert-scale, 2 represented somewhat stressed. The lack of difference in the mean score may be partially attributed to the fact that a 4-point Likert-scale was used. A larger set of scale points may have resulted in more widely dispersed scores. Another possible reason is that pictures may not have had a strong enough presence to induce stress reduction.

This study both contradicts and supports previous research. Many studies support the idea that the presence of an animal provides stress-relieving effects (DeMello, 1999). The present study did not support the idea that seeing a picture of an animal reduces stress. On the other hand, a study conducted by Siegel (1990) suggests that it is not merely the presence of an animal, but the relationship the individual has with that animal that reduces stress. This study supports this idea in that no relationships were able to develop between the participants and the animal since it was only a picture. Also, as shown by Eddy (1996), tactual interaction causes the most stress reduction; this level of interaction was not possible in this study.

Strengths of this study lie in the procedure and set-up. This study focused on looking for differences in stress reduction between domestic and exotic animals, which is an area within this topic that has been

largely overlooked thus far. Additionally, similarly to research conducted by Denton, Burleson, Hobbs, Von Stein and Rodriquez (2001) and DeMello (1990), the current study utilized a mathematical task to induce stress. Another strength of this study is consistency; the researcher had specific dialogue for instructing participants through the different steps of the experiment.

There were several limitations in this study, many of which directly related to a lack of time and funding. Regarding the independent variables, the range of pictures may not have provided enough contrast between the types of animals. All pictures used were furry animals. Using a greater range of animals pictures (e.g. reptiles), might induce a larger difference in stress levels between each condition. In addition, pictures of animals were used instead of having an animal present. Having an animal physically present would likely have provided a stronger independent variable. For the dependent variable, the self-report used was based on a 4-point Likert-scale. In future research, it would be advisable to use a larger scale, for example a 6-point Likert-scale. Ideally autonomic responses would be measured instead of relying on self-reports, since autonomic responses are not biased by the participant's thoughts or opinions. In general, they give a more accurate, scientific data set to work with. Finally, it seemed that the mathematics test was not stressful enough. It would have been beneficial if participants had filled out a stress assessment directly after the stressful task in addition to the one completed after viewing the animal slideshow.

Acknowledgements

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APPENDIX A

Smithsonian National Zoological Park: http://nationalzoo.si.edu/ Animals/PhotoGallery

National Geographic: http://plasma.nationalgeographic.com/animals/ index.html

St. Louis Zoo: www.stlzoo.org

Minnesota Zoo: www.mnzoo.com

Moosey's Country Garden: www.mooseyscountrygarden.com

3D Screen Saver Downloads: www.3d-screensaver-downloads.com

AnalyiticalQ: www.analyticalq.com

Dog Luvers: www.dogluvers.com

Volkstudio: www.olegvolk.net

Waiting until after College Graduation to Marry

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Abstract
This study used survey research to capture the attitudes of 25 Midwestern university students on waiting until after college graduation to get married. Results indicate that participants feel that waiting until after college graduation to get married would lead to a more successful marriage. Results also indicate that students believe a higher education can lead to increased employment opportunities and financial stability and that the older a person marries the less likely they will get divorced. It is hoped that this information is utilized to help educate young adults on the benefits of waiting until later in life to get married. This study enhances the knowledge base on the attitudes of young adults and marriage. The next step in research could be to compare the sexes to ascertain any gender differences.

Introduction

Despite continuous changes in gender roles over time, 90% of women in the United Sates will eventually marry (Goldstein & Kenney, 2001). It would be assumed that economic independence of women would be associated with lower rates of marriage, but research has found the opposite to be true. Instead of remaining single, women are waiting until later ages to get married. For women, this means the possibility of a more egalitarian marriage, generating more satisfaction. But what about men? Most of the literature focused primarily on the position of women and had little to say about men. In general, research shows that there are benefits for those who wait until after attaining a college education to get married, including increased employment opportunity and economic advantage.

Literature Review

Research indicates that there are several factors that can impact the success of a relationship. However, there is a lack of recent studies on how age at time of marriage and education impact the success of a marriage. Generally, most studies in this area occurred before 1990 and only a few have been conducted since then. Marriage and divorce trends are beginning to shift, from the 1980s, with highly educated women becoming more likely to marry than women with less education. In

addition, there is an increase in marriage satisfaction, which may be due to the economic adequacy and increased employment opportunities that women with higher education possess. Some studies suggest that the decrease in younger marriages may be responsible for the decline in termination of marriages (Heaton, 2002; Goldstein & Kenney, 2001; Thornton, Axinn, & Teachman, 1995; Bumpass, Martin, & Sweet, 1991).

Goldstein and Kenney (2001) found that both men and women are marrying later than they have in the past. The average age of women at time of marriage has risen from an average age of 20.8 years in 1970 to 25 years in 1998. Goldstein and Kenney's research found that women with a higher educational degree will be more likely to marry than those that have less education. These women will not only be at a better economic advantage than women that do not have a higher education, but they will also have increased employment opportunities. As women weigh the costs of entering marriage before attaining a college education, they may find that the benefits of a higher education include a more egalitarian marriage. Men may also benefit from the increased amount of capital women earn with a more successful career.

Heaton (2002) states that age at time of marriage and education attainment have an affect on marital stability. A reliable predictor of marriage stability is age at time of marriage. Educational attainment comes in at a lesser degree of prediction. Nevertheless, each factor contributes some fraction of value. It can be presumed that those who wait to marry are more mature in terms of age and experience. Perhaps, in terms of mate selection, those who take more time to choose a spouse are able to institute a more enduring relationship. Those individuals that choose to attend college may also choose to postpone marriage until after graduation, so the doors remain open for occupational and geographic flexibility.

Thornton et al. (1995) investigated the positive impact education has on marriage, and their research revealed that a higher education brings more financial security. Their study showed that the more education people acquire, the longer they prolong marriage. People often view marriage as an adult status and not the role of a student. Therefore, people expect that students should complete their schooling before taking on the task of marriage and a family. Tuition bills and other living expenses leave students struggling financially. In addition, most students work only part time jobs, if at all. Financial security plays an important role in a marriage. When people obtain a higher education they are more likely to be financially stable, therefore attending college can be

beneficial.

Bumpass et al. (1991) discussed many factors that can lead to a disrupted marriage. They divided background factors of marital dissolution into sections. Two of these sections included family background (race, education, socioeconomics) and respondent characteristics at marriage (age at marriage, marriage cohort). According to the researchers, young marriages were more likely to be dissolved than marriages that took place later on. The article also reported that women with less education have a higher chance of having their marriage dissolved. Four out of five women who graduated from college were more likely to have a successful marriage than those with less education.

Current research fails to discuss the attitudes that 18-20 year olds have on waiting until after college graduation to get married, as well as a lack of information on the viewpoint of men. As a result, we hope that by examining the attitudes of this cohort we may gain a better understanding of the declining number of young marriages and the effects young marriages have on marital relationships. The current study also seeks to understand the attitudes on how attaining a higher education can benefit a relationship and increase marital satisfaction for both men and women. Studying this concept is important because the divorce rate in today's society is exceptionally high, and it is important to determine predictors of divorce so it can be prevented.

Theoretical Framework

The theory used in this study is the Social Exchange Theory (Boss, Doherty, LaRossa, Schumm, & Steinmetz, 1993). It was developed by Sir James Frazer in 1919. Sociologists George Homans and Peter Blau and psychologists John Thibau and Harold Kelly put it into use in the late 1960's and early 1970's for research purposes. This theory indicates that individuals go into relationships with costs and benefits of that relationship in mind, and that the benefits should outweigh the costs.

As applied to our study, this theory predicts that the sample groups' attitudes will demonstrate beliefs that waiting until after graduation to marry will lead to a more successful marriage. Based on the Social Exchange Theory, it is predicted that individuals will weigh the costs and benefits of going to college and decide that waiting to get married until after graduation will be in their best interest. It is also predicted that students will present motives such as financial stability, increased job opportunity, and maturity as reasons for waiting. This is supported by our findings in the literature.

Purpose Statement

The purpose of this study is to examine the attitudes of college male and female students on waiting until after graduation to marry. It is hoped that the results from this study will be used to increase knowledge on why divorce occurs and to determine ways to prevent it. Marriage counselors, human service representatives, and guidance counselors will be able to utilize our findings to educate people of all ages about factors causing divorce.

Methods

Participants

The study took place at a mid-western university. Participants included 13 female and 12 male students, ages 18-20.

Research Design

This is a cross-sectional design because it collected data at one point in time. Data was collected via self-administered questionnaires, because of cost-efficiency, convenience, and quick return of data, which was particularly important due to time constraints.

For convenience and ease of access, most respondents were residents in college dormitories on campus. This study used quota and snowball sampling methods. The quota sample included 12 males and 13 females, randomly chosen from the campus dormitories including friends/ acquaintances, and was met by surveying students that fit the desired characteristics.

Materials

The survey instrument was approved by the Institutional Review Board before distribution; it included a cover letter stating the purpose of the study, instructions for completing the survey, a statement affirming voluntary participation, and a declaration assuring the confidentiality of all responses.

The data collection instrument was a written questionnaire. Participants were asked about their academic status, gender, and age. The questionnaire included five questions, based on a 5-point Likert scale, from (1) strongly disagree to (5) strongly agree, asking respondents to choose and circle the best-fitting answer to match the intensity of their attitudes about each statement. The five questions were driven by the literature review and personal curiosity regarding students' attitudes on divorce, financial independence, increased job opportunity, and

educational attainment. The survey questions met face and content validity. Questions were designed to cover the whole spectrum of what was found in the literature review. The survey was piloted on acquaintances and they affirmed that the survey was clear and had felt no further suggestions were needed.

Procedure

During the data collection process, students on campus between March 8th and March 10th, 2006 were asked if they would be willing to complete the survey. To try and reach the target age of 18-20, most respondents were found in underclassmen dormitory settings and completed the survey while we circulated the building. In order to get an equal representation of males and females we chose to sample 13 females and 12 males.

All students approached were willing to participate. After agreeing to participate, students were given the survey and, after reading the cover page, were asked to circle the responses best representative of their attitudes. Participants were given an additional sheet of paper and instructed to use the sheet for any additional comments. Surveys were completed in the presence of one of our research team members and respondents were thanked for their participation.

Data Analysis Plan

In an effort to ensure data validity, research was "cleaned" and "coded." All surveys were fully completed so none had to be discarded due to missing data. Cleaned surveys were then coded using acronyms for each variable. As a research team, we created a code book, assigning a name to each variable and a number to each of the potential responses to every question.

Demographic variables were coded first: gender and age. Then, each of the statements on the survey instrument were given a variable name: individuals should wait until after college graduation to marry (*AGR*), a college degree can lead to a more successful marriage (*SUC*), people with a college degree are more likely to be financially stable (*FIN*), individuals that go to college have increased employment opportunities (*JOB*), the older a person marries the less likely they will be divorced (*ATM*). For each of the five statements, numbers were assigned to the range of potential responses: 1=strongly disagree, 2=disagree, 3-undecided, 4=agree, and 5=strongly agree.

To analyze the data, we employed the use of the data-analyzing

computer program Statistical Package for the Social Sciences (SPSS). Using this program, we analyzed the dependant variables and used the individual as our level of analysis. Frequencies and a reliability analysis were conducted to determine whether or not the survey variables measured what they intend to measure.

Results

A frequency distribution indicated no missing data; results can be seen in Table 1.

Table 1

Frequency Distribution

Variable	Response			
	Disagree	Undecided	Agree	Strongly Agree
AGR	8%	24%	52%	16%
SUC	8%	36%	48%	8%
FIN	4%	12%	48%	36%
JOB	4%	8%	32%	56%
ATM	16%	20%	48%	16%

Note. (AGR)=Individuals should wait until after college graduation to marry; (SUC)=A college degree can lead to a more successful marriage; (FIN)=People with a college degree are more likely to be financially stable; (JOB)=Individuals that go to college have increased employment opportunities; (ATM)=The older a person marries the less likely they will be divorced.

A reliabilitytest was done to determine if the variables were an accurate measure of the main concept (waiting until after college graduation to marry is beneficial). According the Chronbach's Alpha measure of reliability, our variables (AGR, SUC, FIN, JOB, ATM) score was .791. This shows that these variables are a good measure of students' attitudes towards waiting until after graduation to marry.

Discussion

It was predicted that students would feel that waiting until after graduation to marry leads to a more successful marriage. Sixty-eight percent of those surveyed believe that individuals should wait until after college graduation to marry, 24% of students were undecided.

Results also supported the hypothesis that students would present motives for waiting to get married. More specifically, results indicated that students believe a higher education can lead to increased employment opportunities and financial stability, which is supported by Thornton, Axinn, and Teachman's (1995) discussion regarding the importance of financial stability in a marriage. Thornton et. al. and 84% of participants express the belief that a higher education can increase financial stability. Results also show that 88% of those surveyed agreed that persons with a college degree have more job opportunities. Increased job opportunity and income are believed to cut down on the financial strain in the relationship. Consequently, a college degree can lead to financial stability which then decreases the likelihood of divorce due to financial strain.

Limitations and Implications for Future Research

Our biggest concern was that of the sample size. Due to time constraints a sample that was easy to access and small in number was needed. If repeated, we would have liked to obtain a bigger sample size to get a broader range of responses that could be generalized to the larger population. The next step in research could be to compare the sexes to ascertain any gender differences.

Implications for Practitioners

Since the study was based on the benefits of waiting until after college graduation to get married, the results would be useful to Guidance Counselors in high schools and colleges for young adults inquiring about going to college, relationships, and/or marriage. In today's society, youth are more likely to go to college and are holding off marriage, family, and kids until later in life (Goldstein & Kenny 2001).

Conclusion

As a result of this study, we hope that it will help the general population see that young adults may be more apt to hold off on marriage to further education, search for self-interests, and become more financially stable/independent. We also hope this information will utilized

to help educate young adults on the benefits of waiting until later in life to get married.

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Life, Death, Fate and Eternity

Matthew Banker
Undergraduate Student, Studio Art

Each of us exists in real time. Each moment is a unique experience that cannot be relived, and despite our beliefs, hopes, expectations and knowledge we cannot see the future. We grow slowly and somewhat imperceptibly, but our experience is punctuated with times of joy, sadness, trauma, birth and death. The specific moments that define that passage of time for each person are one of the main inspirations for my work.

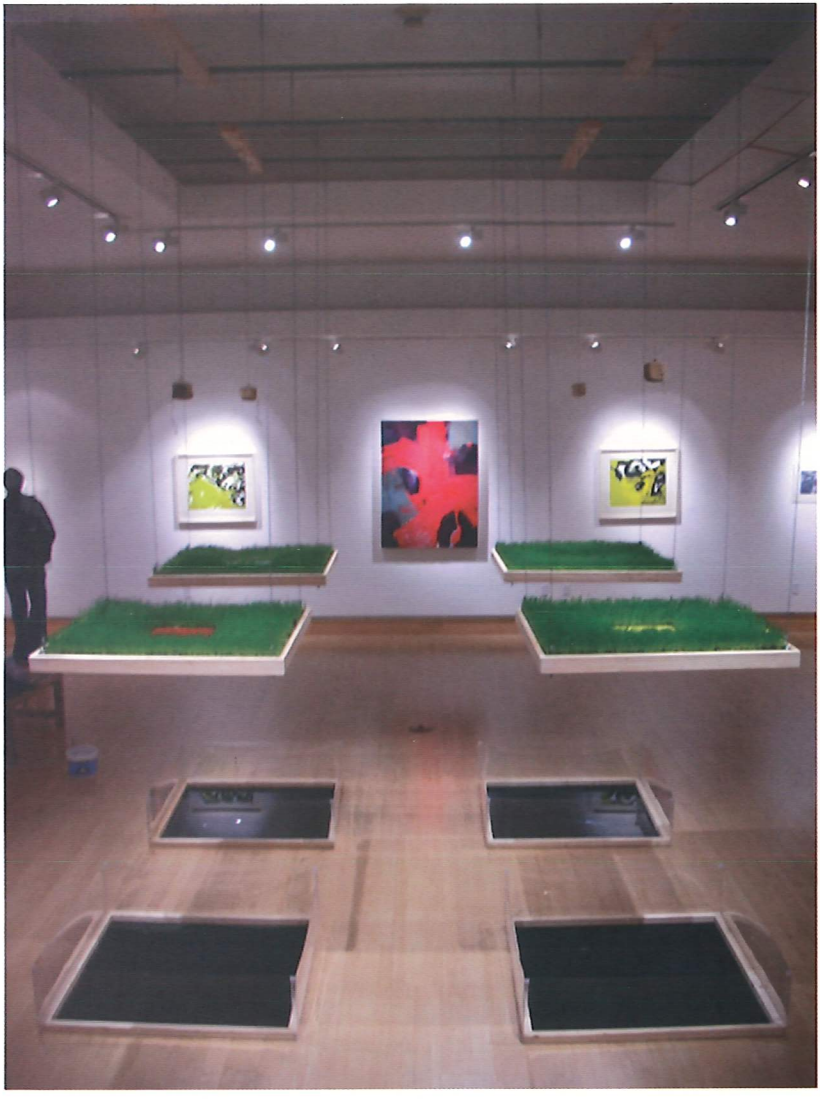
I use a variety of materials; both man made and natural. The materials are chosen for symbolic and aesthetic significance.

Each installation changes throughout the time it is displayed. Some changes are dramatic and obvious; some changes are slow and subtle. Anticipation of action is often an important element; also important is the sense of disappointment and loss at having missed a seemingly significant event.

My most recent work deals specifically with death. It questions how we each deal with the idea of our own death, how death affects those who are still living, and how we remember and honor those who have died.

Matthew Banker (2006)
Epilogue
8'x4'x8'
Wood, Glass, Brick, Twine, Text

Matthew Banker (2006)
Apostle / Apostate
8'x2'x8'
Ceramic cups, Wood, Rope



Matthew Banker (2006)
Untitled (Suspension)
12'x12'x14'
Grass, Wood, Brick, Glass, Steel Cable, Twine

Matthew Banker (2006)
Untitled (Suspension)
12'x12'x14'
Grass, Wood, Brick, Glass, Steel Cable, Twine

Separation Eternal

Darren Tesar
Undergraduate Student, Art and Design

The combination of video onto my barely painted canvases urges the viewer to reexamine the concepts of the still in the moving. Archival medical videos projected onto the canvas itself, communicate preservation and sustainment. The graphic and outdated practices are then looped to further stress this confinement. The loop is forced to exist in a state of repetition that results in no beginning or end. I believe this leaves no room for a transcending resolution. Only in the existence of repetition and predictability does the video mirror that of a painting. The video moves endlessly, yet is no more than a single representation juxtaposed against another single image, the painting.

The subject matter in my painting takes on iconic interpretations of nostalgia and control. Imagery of architecture and objects, such as airports and whoopee cushions are stripped of their original context and thinly dry brushed onto a blank canvas. Without the objects' original context it stands to be reinterpreted with the supplemented video.

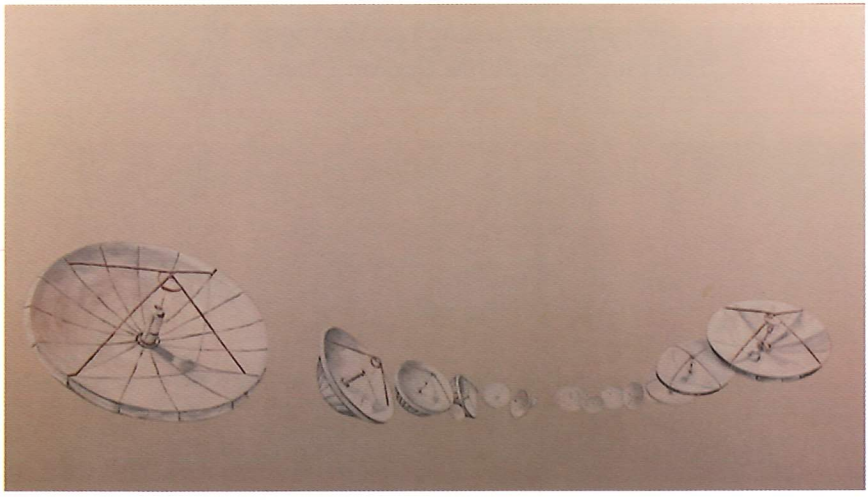
I appropriate all my images from the Internet. This use of imagery perpetuates an objective indifference to the subjects' original context and exploits it for its intellectual significance.

Thematically my goals are existential in nature, and attempt to investigate ontology in a postmodern setting. The narratives that I employ circle closely around the absurd. I use absurd to mean the futility in attempting to construct absolute conclusions and meaning in the images I compose, and in larger meta-narratives of our existence. It is my desire to romanticize this relationship we have with ourselves in the midst of nothingness. These questions concern our humanness, with its temporal existence, which will be outlived by that which we create. My work attempts to address these questions with poignancy and honesty.

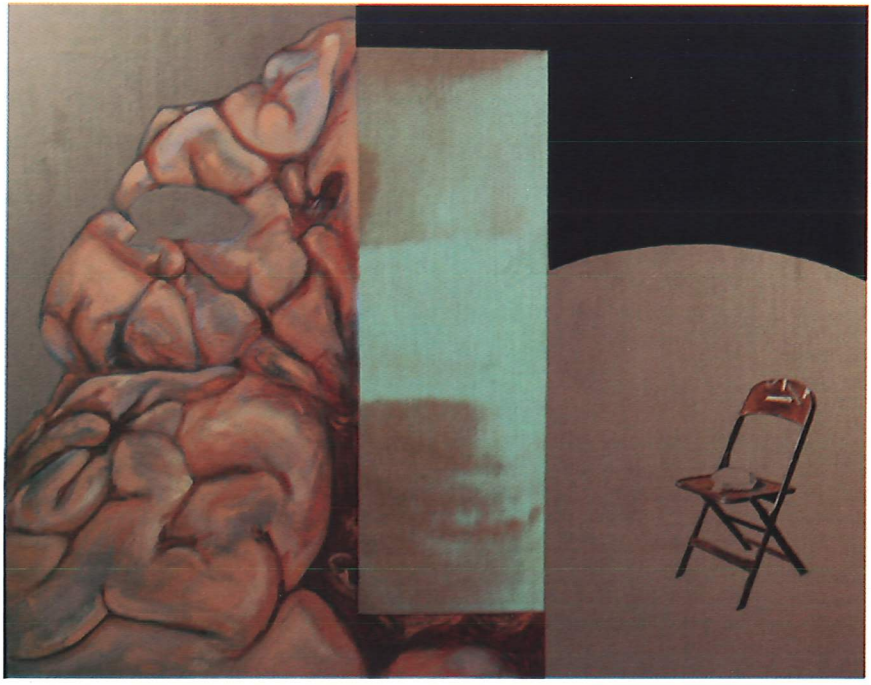
"Beauty is unbearable, drives us to despair, offering us for a minute the glimpse of an eternity that we should live to stretch out over the whole of time."

- Albert Camus

Darren Tesar (2006)
"The weight of commitment to all our treasured beliefs"
Oil and Video Projections on Canvas, 3 ½' x 7'



Darren Tesar (2006)
"We don't want knowledge; we want certainty"
Oil on Canvas. 4' x 6'



Darren Tesar (2006)
"As soon as he realized why he was laughing,
he began to laugh all the more"
Oil and Video Projection on Linen, 4' x 5'

Darren Tesar (2006)
"Hope lives on the applause of all out weak and worried hands"
Oil and Video Projection on Canvas, 2' x 6'

Mug, Three Tiered Tray, Mug, Two Tiered Tray

Joshua Ausman
Undergraduate Student, Art and Design

I create my work in patterns of consideration and intuition. I allow myself to work free of criticism, trusting my sensibilities. Upon reaching a certain point of any work, I then try to judge the work in an attempt to discover what the piece is lacking and how to best remedy its problems. The role of the problem solver is one that I ardently accept.

My interest in functional pottery lies with its position in our lives, its familiarity with our touch, its seemingly modest proposal. I choose this language for this connection to life and its various points of accessibility. I am concerned with the possibility of function, its actuality is redundant. I find beauty in the futility of crafting functional art.

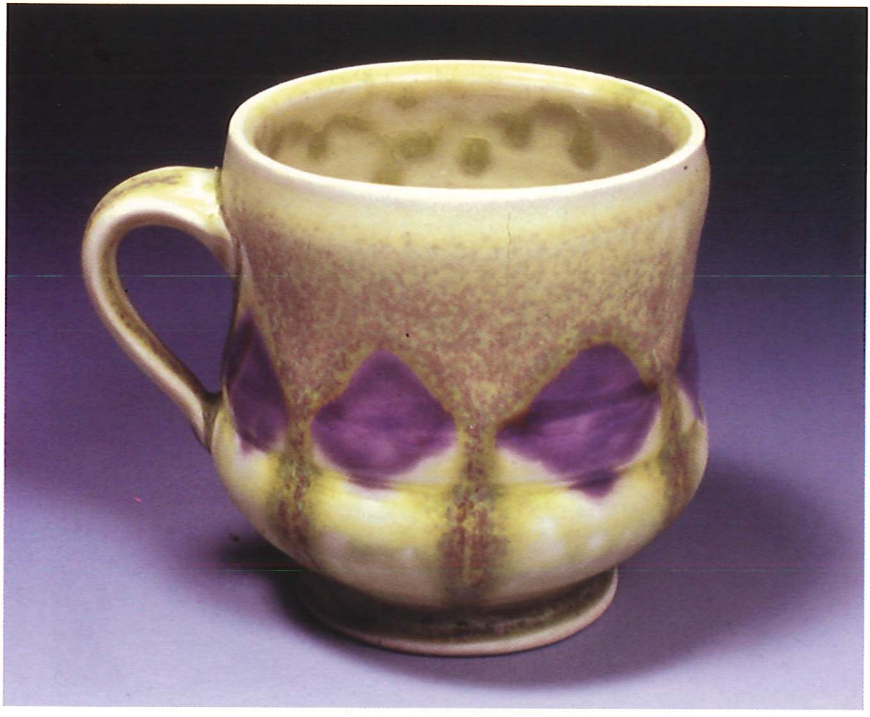
I find a particular interest and success in my creations when I am able to maintain a certain level of detachment from my work, in which I can focus on the process, allowing me to push the work to a conclusion that would have been otherwise unobtainable.

The exploration of windows and light greatly interests me. I pattern my surfaces with shapes alluding to windows. I find windows to be a metaphor of elegance, protection, freedom and confinement. It is within these parameters that my work exists.

As Robert Rauschenberg said, "Painting relates to both art and life. Neither can be made. (I try to act in that gap between the two.)" I believe that ceramics and, even more so, functional pottery cannot help but exist within this space.

Joshua Ausman (2005)
Mug
Porcelain ^10 Oxidation
6x5x4

Joshua Ausman (2005)
Three Tiered Tray
Porcelain ^10 Oxidation
15x10x10



Joshua Ausman (2005)
Mug
Porcelain ^10 Oxidation
5x5x4

Joshua Ausman (2005)
Two Tiered Tray
Porcelain ^10 Oxidation
12x15x15

Untitled Seascape

Charlotte Mann
Undergraduate Student, Art and Design

The world of art is full of freedom, creation and imagination, that is why I take part it in. Through art, I can share my unique qualities and visions. Art facilitates my reactions to the world; it is a means of sharing personal reflections.

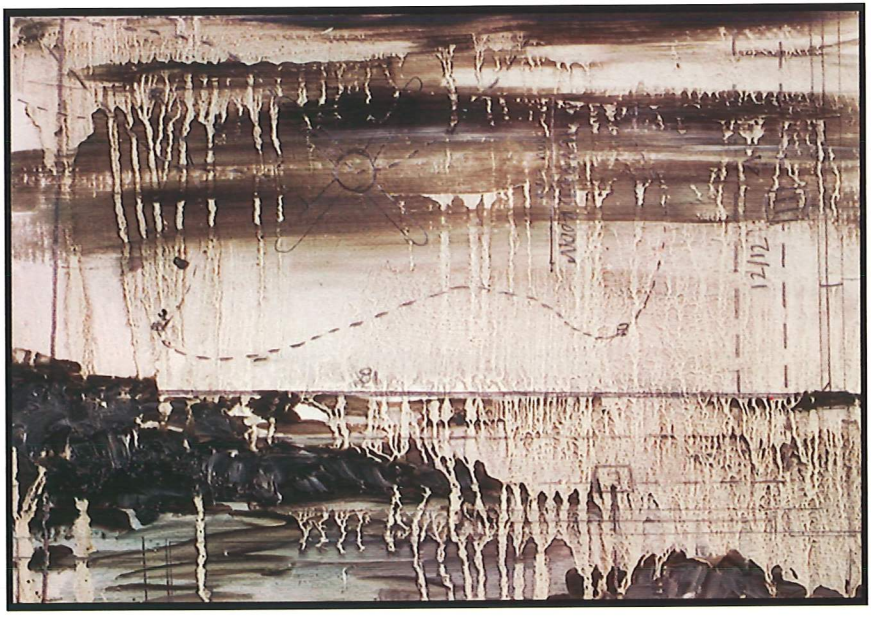
My artwork is an abstract correlation of blueprints, nature and atmosphere. In this body of work, I view time beyond the length of a lifespan. I look at how environmental changes happen insignificantly each day but massively over time. I depict oceans due to their rapid movements, changes, and how over a long period of time their landscapes are changed dramatically. I use this as a metaphor for human life. I look at the way decisions made, appear to gain importance as time passes. The outcome of any human decision is impossible to predict, much like an ocean.

I like to focus on reactions to events that happen. These events do not have end results that are expected. Although life changes day to day, it's about looking to the past to see the major transformations. Through blueprints, I encourage the viewer to engage and think about the future, to create their own narratives. These blueprints are only beginnings and others determine whether they are successful.

"We cannot live only for ourselves. A thousand fibers connect us with our fellow men; and among those fibers, as sympathetic threads, our actions run as causes, and they come back to us as effects."

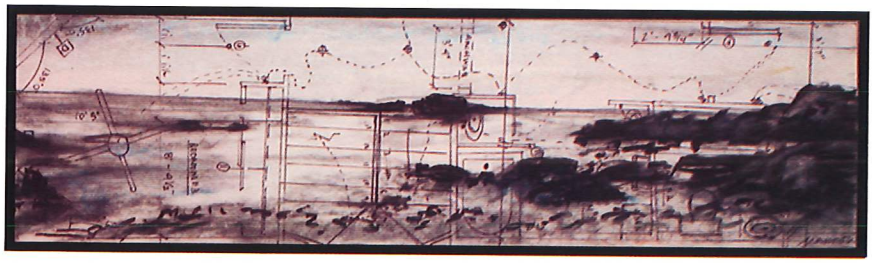
- Herman Melville

In my work I use gestural and varied line qualities, muted colors and tones, and different viscosities of textural build-up. The way I use these techniques helps connect my intentions for the overall effect my pieces have. I feel that vibrant colors are not necessary for my subject matter and that muted tonal changes instead, push the viewer to look and consider why I have chosen these qualities. Through these tones, gestures and textural build-ups I show movement, and a sense of history. I show blueprints and oceans that are waiting for a conclusion.

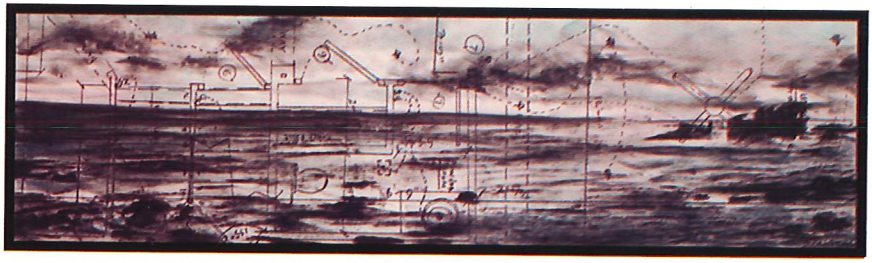


Charlotte Mann (Sept 2006)
Untitled Seascape
10"x 6" Oil, graphite

Charlotte Mann (May 2006)
Untitled Seascape
42"x12" Oil, mixed-media



Charlotte Mann (May 2006)
Untitled Seascape
19"x6" Mixed-media



Charlotte Mann (April 2006)
Untitled Seascape
19"x6" Mixed-media

College Students' Attitudes on the Causes of Infidelity

Kaisa Lee and Jamie Koss
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Key Words: Infidelity, committed relationships, relationship dissatisfaction, sexual attraction

Abstract
Infidelity is a problem in today's society associated with instability in relationships and the high divorce rates. The study consisted of 23 male and female students at a Midwestern university. It was hypothesized that males would perceive sexual attraction as a primary cause of infidelity while females would perceive relationship dissatisfaction as a primary cause. Survey data was statistically analyzed using frequencies, cross-tabulations and a reliability analysis. Findings supported the literature and hypothesis in that more males viewed sexual attraction as a primary cause of infidelity and more females viewed relationship dissatisfaction as a primary cause. It is important for practitioners to be aware of the problems infidelity causes in relationships and further researchers could investigate root causes for preventative and proactive actions.

Introduction

Roughly 50% of individuals in married relationships engage in some form of infidelity at some point in their marriage (Drigotas, Safstrom & Gentilia, 1999). It is no wonder researchers are studying this serious relationship transgression more to better understand the root of the problem. In several studies, more than fifty percent of both men and women in college dating relationships have been involved in some form of infidelity behavior (Lewandowski & Ackerman, 2006). Infidelity can be portrayed differently in society and between men and women. It causes a great deal of distress, turmoil, and often termination of the relationship. Society's high rate of divorce and infidelity in the relationship indicates the need for this problem to be more widely researched and addressed. In this study infidelity refers to a violation in trust or a breaking of understanding about the sexual monogamy of the relationship (Pittman & Pittman Wagners, 1995). Male and female college students were surveyed on their attitudes on the causes of infidelity in committed relationships.

Literature Review

It was found that there are definite differences and similarities between males and females regarding their attitudes towards causes of infidelity. Predicting infidelity has various components such as composite, physical, and emotional infidelity. It was found that when there is commitment, satisfaction, fewer alternatives, and a strong investment in the relationship, there are considerably fewer infidelity behaviors. Females were found to view emotional infidelity as more upsetting and males found sexual infidelity to be more upsetting. Jealousy is found to be a key result and trigger of infidelity. One study found that the plausible reasoning for causes of infidelity varied among genders. Legitimacy, seduction, sexuality, sensation seeking, normalization, and social background make up the six component model of infidelity, used to measure such behavior in this study. Males were found to view seduction as the major cause while women were found to view social background as a major cause of betrayal. Cross-cultural research is important in finding similarities and differences. When need-fulfillment and self-expansion were looked into they found that lower levels of each of these pieces led to higher susceptibility for infidelity. Very little research was found on the causes of infidelity according to the views of each gender. All the information found regarding infidelity is supportive in regards to linking gender differences with infidelity (Drigotas et al., 1999; Harris, 2003; Yeneceri & Kokdemir, 2006; Lewandowski & Ackerman, 2006).

When predicting infidelity behavior, three main types were found: composite infidelity, physical infidelity, and emotional infidelity (Drigotas et al., 1999). Within those three topics, the researchers measured commitment, satisfaction, alternative quality and investment. Those individuals that were studied who were more satisfied and committed, had fewer alternatives, and were invested in their relationships more were less likely to have infidelity behaviors. The findings of this article suggested that women were more likely to engage in such behaviors. Overall, individuals who engaged in infidelity behaviors reported less satisfaction and commitment.

When looking at infidelity in relationships, undoubtedly jealousy comes to mind as an outcome of this behavior. Harris (2003) has taken a closer look at gender differences in jealousy as a result of infidelity. Social-Cognitive Theory was used to look into these differences of male and female variables comparing emotional infidelity and sexual infidelity. A survey was administered to assess college students' attitudes

towards actual infidelity, hypothetical infidelity, which type of infidelity would be worse: emotional infidelity or sexual infidelity, as well as the relationship experiences of the participants. The results of the study showed that forced-choice hypothetical infidelity supported the notion that women view emotional infidelity as the worse form of infidelity. Another discovery to the study was that men placed higher importance on sex which was a stronger predictor for sexual jealousy over women. A trigger to jealousy for males was the perception that females sexual act is driven by love. However a woman's trigger was shown to be emotional involvement. More females were found to believe that if a male is either emotionally involved or in love with another, then sex would also be involved. Jealousy is a significant component to infidelity in relationships especially when viewed via a social-cognitive perspective. Jealousy as looked at in this study is a major component of both the causes and results of infidelity. Emotional and sexual infidelities are the two types that decipher between the two genders.

Yeniceri and Kokdemir (2006) conducted a cross–cultural study investigating possible reasons for infidelity behavior, broken into six components. This study concluded that males rated seduction as the primary cause of infidelity more so than females did. Females perceived social background as a major cause more often than men did. Seduction was viewed as the major cause of infidelity when it was the male partaking in the behavior. Conversely, if the female is to blame for infidelity then legitimacy was perceived as a more reasonable cause.

Lewandowski and Ackerman (2006) reported that the lack of need fulfillment and self-expansion were additional predictors of susceptibility of infidelity. A group of college students were surveyed on five types of need-fulfillment (intimacy, companionship, sex, security, and emotional involvement). Three types of self-expansion were assessed such as self-expansion, inclusion of the other in the self, and potential for self-expansion. Susceptibility to infidelity was the last variable in the study to be evaluated connecting with need fulfillment and self-expansion. Their hypothesis predicted that gender, relationship length, need fulfillment, and self expansion will contribute a major increase to the overall variance in susceptibility to infidelity. The results to their study supported their hypothesis. In fact, lower satisfaction in need fulfillment and lower levels of self-expansion lead to higher susceptibility to infidelity. A significant finding to the research was that gender plays a large role in susceptibility to infidelity. The results showed that males are more susceptible to infidelity than women. This study focused on the

prediction of infidelity as well as the beliefs of college students on the sole causes of infidelity.

It has been found across studies that there are definite variables among the two genders regarding the reasons for and views toward infidelity (Yeniceri & Kokdemir, 2006). Research has discovered differences between males and females regarding emotional and sexual infidelity (Harris, 2003). It also has defined some possible reasons for such behaviors. Models have been created to measure infidelity amongst couples and theories have been made regarding the susceptibility (Lewandowski & Ackerman, 2006). Most of the research that has been conducted addresses many forms of infidelity, predictions for the relationship as well as socialization components (Drigotas et al., 1999). While many studies on infidelity were found, only the study conducted in Turkey pertained directly to our topic. The Social Learning Theory was used as a framework for the causes of infidelity. There is little research that has related this theory to the two genders' views on the causes of betrayal within a relationship; this is the gap in the family social science literature that we hope to fill.

Theoretical Framework

Bandura's Social Learning Theory indicates that by observing behaviors that are modeled one tends to then imitate or match performances (Mihalic & Elliott, 2005). Humans learn and comprehend attitudes and behaviors as a result of the social interactions they have with other people (Strong, DeVault, Cohen, 2005). Bandura said that human nature is formed by the connections between the individual. Bandura further stressed the importance of learning by observation of others instead of solely from oneself. As applied to our study, this theory would predict that by observing infidelity behavior by one's peers, media, or family, one would deem such actions as acceptable in their dating relationships.

Purpose Statement

The purpose of this study was to examine the attitudes of a group of Midwestern University male and female students' perceptions on the causes of infidelity. The central research question in this study was, "What are the comparable attitudes of a Midwestern state university sample of male and female students regarding the causes of infidelity behavior in committed relationships?" It was hypothesized that the males would rate sexual attraction as the primary cause for infidelity and

females would rate relationship dissatisfaction as the primary cause.

Methods

Participants

This study was done at a small Midwestern university. There were 14 female and nine male college student participants. Participants' ages ranged from 18-25. In regards to the academic status of females, two were sophomores, two were juniors, and 10 were of senior status or higher. Of the male participants, there was one freshman, two juniors, five were at senior status or higher, and there was one graduate student. There were 11 females and eight males that had previously been in a committed relationship and of those who were currently in a committed relationship, 12 were females and three were males. Three females and one male had not previously been in a committed relationship but were currently in one. Two females and six males were single.

Research Design

The design is most appropriately described as the cross-sectional design type. The form of data collection was self-administered surveys. The population was the university student body. The sample consisted of males and females ages 18-25 that were currently in or previously in a committed relationship. The sampling design type used was the nonrandom snowball design type because this type allowed researchers to search within their personal networks to obtain those individuals who were in the types of relationships needed for this research. The primary reason snowball type and nonrandom were used was we were accessing an inaccessible population. In order to ethically protect our human subjects, we completed the Human Subjects Institutional Review Board (IRB) training and then were approved by the IRB to begin data collection.

Data Collection Instrument

A survey was designed to collect data about the attitudes of students regarding the causes of infidelity in committed relationships. The survey contained a cover letter and an implied consent form that described what the study entailed. A definition of any terms that would not be universally known, risks and benefits, time commitment, confidentiality, voluntary participation, instructions for completing the survey and contact information of the researchers, as well as the supervisor was also included.

Age, gender, academic status, and relationship status made up the demographic questions. Based on a five point Likert scale, the survey contained nine closed-ended questions regarding what the participants thought was the primary cause of infidelity. The scale ranged from one being strongly disagree, to five being strongly agree. Questions were created from infidelity literature. The survey instrument has both face validity and content validity.

Procedure

Participants were selected from each of the researcher's social networks. This ensured they had a personal experience with a committed relationship at some point. We contacted participants via phone, email, or in person and worked out a time that worked best for them to take the survey. Since the topic could potentially be uncomfortable for some participants, extra care was used to make sure they knew that the survey was voluntary and that they did not have to participate if they did not feel comfortable. We asked them to choose a setting that would best suit them to take the surveys; most of which was at their home or on campus. With each participant we distributed the survey and read the survey verbatum. Participants were instructed to place their completed surveys in the envelope provided. We stepped out of the room or area in which they took the survey so they would not feel rushed or pressured to answer questions in a way they thought would be socially acceptable. We also made sure they were taking it in separate areas if they were taking the survey simultaneously with another person, such as their significant other. This ensured that there was no pressure to answer the questions in a biased manner. Our survey instruments were kept in a large sealed envelope at one of the researcher's homes in a locked closet.

Data Analysis Plan

Data was first "cleaned" and checked for any missing data. The surveys were then "coded" using acronyms for each of the demographic and dependent variables. The demographic variables were: Academic status (*STAT*), gender (*GEN*), and age (*AGE*), with gender being an independent variable. The other two demographic variables were if they had previously been in a committed relationship (*PCR*) or if they were currently in a committed relationship (*CCR*). To determine which dependent variables the participant felt to be the primary cause of infidelity, they were asked about: lack of personal accountability (*LPA*), relationship dissatisfaction (*RDS*), lack of security in relationships (*SEC*), lack of attention from

partner (*ATN*), sexual attraction (*SXA*), sexual dissatisfaction (*SDS*), revenge on partner (*RVG*), being exposed to infidelity in one's group of friends, peers, or media (*EXP*), or alcohol consumption (*ALC*). The level of analysis was the individual. To analyze the data, the data-analyzing computer program called *Statistical Package for the Social Sciences* (*SPSS*), was used. Given the fact we were comparing groups based on gender, our data analysis included: Frequencies, cross-tabulations, mean-comparisons, and a reliability analysis called Chronbach's Alpha.

Results

A frequency distribution analysis indicated that there was no data missing from our surveys. The Chronbach's Alpha measure of reliability was .780 in this analysis. This indicates that the survey items were a reliable index of our major concept on college students' attitudes on the causes of infidelity.

Table 1

Crosstabs

Gender	SD	D	U	A	SA	Total
LPA						
Female	0.0%	21.4%	21.4%	35.7%	21.4%	100.0%
Male	0.0%	11.1%	33.3%	44.4%	11.1%	100.0%
RDS						
Female	0.0%	14.3%	7.1%	50.0%	28.6%	100.0%
Male	0.0%	0.0%	11.1%	66.7%	22.2%	100.0%
SEC						
Female	7.1%	0.0%	14.3%	57.1%	21.4%	100.0%
Male	11.1%	11.1%	11.1%	44.4%	22.2%	100.0%
ATN						
Female	0.0%	7.1%	0.0%	57.1%	35.7%	100.0%
Male	0.0%	0.0%	0.0%	77.8%	22.2%	100.0%
SXA						
Female	7.1%	7.1%	28.6%	28.6%	28.6%	100.0%
Male	0.0%	33.3%	0.0%	44.4%	22.2%	100.0%
SDS						
Female	0.0%	21.4%	21.4%	21.4%	35.7%	100.0%
Male	11.1%	22.2%	22.2%	44.4%	0.0%	100.0%

RVG						
Female	0.0%	21.4%	28.6%	42.9%	7.1%	100.0%
Male	0.0%	22.2%	22.2%	44.4%	11.1%	100.0%
EXP						
Female	14.3%	21.4%	21.4%	42.9%	0.0%	100.0%
Male	11.1%	11.1%	44.4%	22.2%	11.1%	100.0%
ALC						
Female	0.0%	7.1%	21.4%	35.7%	35.7%	100.0%
Male	11.1%	0.0%	33.3%	44.4%	11.1%	100.0%

Note. (GEN)=Gender of participant; (LPA)=Lack of personal accountability is a primary cause of infidelity; (RDS)= Relationship dissatisfaction is a primary cause of infidelity; (SEC)=Lack of security in relationships is a primary cause of infidelity; (ATN)= Lack of attention from partner is a primary cause of infidelity; (SXA)=Sexual attraction is a primary cause of infidelity; (SDS)=Sexual dissatisfaction is a primary cause of infidelity; (RVG)=Revenge on partner is a primary cause of infidelity; (EXP)=Being exposed to infidelity in one's group of friends, peers, or media has a lot to do with the cause of infidelity; (ALC)=Alcohol consumption has a great deal to do with the cause of infidelity

Discussion

Overall, results supported the hypothesis by demonstrating that the majority of males thought sexual attraction was a primary cause of infidelity. Results also demonstrated that the majority of female participants thought that relationship dissatisfaction was a primary cause of infidelity. In our study, our hypothesis using the Social Learning Theory was supported because both male and female responses were evenly distributed along the Likert scale on the exposure to one's peers, friends, or media being the primary cause of infidelity. This shows that neither males nor females viewed this as a primary cause of infidelity. Lack of attention from one's partner had 100% of males and 92.9% of females agree that this was a primary cause of infidelity. This variable was rated the highest compared to all the others between both genders.

The majority of our results were also supported by our literature. Regarding relationship dissatisfaction, the literature supported the idea that the more dissatisfied you are in your relationships, the more likely you are to have infidelity behaviors (Drigotas et al., 1999). The work done by Harris (2003) supported our hypothesis that females view relationship dissatisfaction as the primary cause of infidelity while men view sexual attraction as the primary cause of infidelity. She found that

women view emotional infidelity as a worse form of infidelity while men view sexual infidelity as a worse form. The emotional dimension relates to females' view of relationship dissatisfaction while the sexual dimension relates to males' view of sexual attraction.

Literature that supported our results the strongest was the study done by Yeniceri and Kokdemir (2006). Their six components related closely to the variables in our survey. Their results were similar to ours in saying that they found men to view seduction as a major cause of infidelity as we found the sexual attraction component with males. They also found females to view legitimacy as a major cause of infidelity as we found the relationship dissatisfaction and lack of security in the relationship components with females. Their study also found that women view social background to be a major cause of infidelity. Our study also found women to view the exposure to infidelity in one's group of friends, peers, or media as a major cause of infidelity. Lewandowski & Ackerman's (2006) found that lower satisfaction in need fulfillment and lower levels of self-expansion lead to higher susceptibility to infidelity. Their results supported our findings that 100% of males and 92.9% of females agreed with the statement that lack of attention from one's partner was a primary cause of infidelity. The variable lack of personal accountability (*LPA*) was also highly rated by both genders. Overall, our literature supported our results and our hypothesis.

The Social Learning Theory assumes that by observing behaviors that are modeled, one tends to then imitate or match performances (Mihalic & Elliott, 2005). This theory relates to the variable statement that exposure to infidelity in one's group of friends, peers, or media can be a cause of infidelity (*EXP*). This supports what we predicted to find through our research; the majority of males were undecided at 44.4% and the majority of females agreed with this statement at 42.9%. Our theory could explain more females agreeing with this statement because of females having a higher awareness of infidelity in their peer groups than males may have. Females may discuss personal issues and also do this in groups more than males, leading to an increased likelihood of these behaviors being imitated. The difference in responses could also be explained due to societal gender role constraints that males may consider infidelity a "rite of manhood" and not think about how another man's infidelity could impact his own behavior.

Limitations

A limitation to our study was that we had a small sample size to

compare, contrast, and generalize to a larger population of male and female college students. Time constraints also limited us to the number of participants and the lack of diversity in our sample population. Being at a smaller Midwestern university also limited us to a less diverse population. We used the non-random sample method which limited the study to a certain population chosen by the researchers. This was due to the fact the participants had to previously or currently be in a committed relationship and to do this we had to select the participants ourselves. The fact that the survey participants were selected by the researchers may have limited the diversity and variance among groups of students that were involved in the study.

Implications for Practitioners

Findings can be applied by counselors, especially those at a university working with dating relationships among college students. Family practitioners can best use our findings by applying them to marriages, committed dating relationships, and for their own understanding of this problematic issue. Marriage and family therapists need to have the knowledge of this issue to further help those affected by infidelity. The high divorce rates indicate the need for those working in the field to understand some of the problems within relationships. Students can also apply our research findings for their own knowledge and understanding. It is important to be aware of the information available to benefit one's own relationships.

Implications for Future Research

Future research could use a larger sample population and try to randomize the sampling by having a longer period of time to distribute surveys. A further step that could be taken would be to survey those that have experienced infidelity first-hand. Another way to get first-hand accounts of infidelity could be to do a qualitative study by interviewing individuals who have been affected by infidelity personally. This would make the study even more plausible by increasing the richness and purity of first-hand account perspectives. Another implication for future research could be to have more variables to the survey related to the Social Learning Theory. This would provide further possible explanations to the findings.

Conclusion

It is hoped that the issue of infidelity will be looked into further

and taken into account when dealing with committed relationships. Counselors, family practitioners, marriage and family therapists, and those in relationships themselves need to address this issue with importance and awareness. We want people to recognize that infidelity is a big problem in today's society and to understand how music, TV, movies, and other forms of media play into and normalize this issue. Relating to our theory, we want greater awareness that being around those involved in infidelity behaviors can affect the way one views the issue and behaves in relationships. Infidelity has not been highly researched and the causes have not been looked into thoroughly by other researchers out there in the field. Our study filled some of the gaps concerning the possible causes to this problem in relationships. Infidelity is a problematic issue in relationships that needs to be looked into and recognized when working with couples.

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Edge Detection and Feature Extraction in Automated Fingerprint Identification Systems

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Key Words: Edge detection, thinning, feature extraction, afis, perceptron, mlp, neural network, laplace

Abstract
As a means of access control and criminal identification, Automated Fingerprint Identification Systems (AFIS) are widely utilized. In many areas of business, these systems are entrusted to verify identities of personnel before allowing access to restricted information or facilities. In the area of criminal investigation, these same systems are entrusted to find, match, and identify criminals. Obviously, these systems are given critical tasks and are performing them unsupervised most of the time. Although most steps in the process are procedural and can be automated, there are two critical phases that need to be performed intelligently and reliably. These two phases are edge detection and feature extraction. In order to enhance important features accurately in the fingerprint image, methods in edge detection are applied. Once the important features are exposed and artifacts are removed, feature extraction takes place. In this phase, the print is characterized by the extracted features for matching later. This article looks at the theoretical foundations and practical aspects of these two phases to understand their automation.

Introduction

Fingerprint technology is the most widely used form of biometric technology. The most popular method for acquiring fingerprints is by collecting inked impressions. There are recent technologies which allow the collection of fingerprints using scanning tools. Automated Fingerprint Identification Systems (AFIS) have now been developed to improve accuracy and efficiency over the previous fingerprint matching solutions. With the increased concern for identity theft and other privacy issues, fingerprint recognition systems and other biometric authentication systems are necessary to address security needs in the international community. AFIS is now used internationally for tracking criminals and preventing fraudulent voting. Many police departments use these systems to capture, search, and store fingerprint images from crime scenes. Some

AFIS are capable of searching through fingerprints at a rate of 4,000 comparisons per second.

Overview of Automated Fingerprint Identification Systems

Each vendor offers different versions of AFIS. However, every system has the same fundamental parts: image recording and image matching. Both processes acquire and extract features from fingerprint images. The image recording process has the responsibility of enrolling fingerprints into the database. The image matching process compares candidate prints to the enrolled prints as part of the verification process in the feature matcher. The feature matcher will produce a binary result of either a successful match or an unsuccessful match. See Figure 1 for a representation of an AFIS.

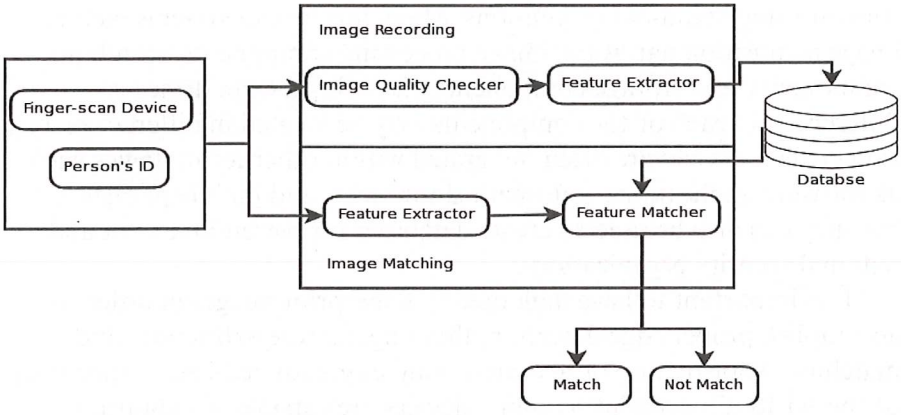

Figure 1. A typical Automated Fingerprint Identification System.

This article focuses on the feature extractor component shown in Figure 2. There are three main processes inside the feature extractor. The first process consists of gray scale normalization and edge detection. Secondly, the image is thinned to reduce artifacts and anomalies. Finally, the actual feature extraction takes place and fingerprint minutiae are identified.

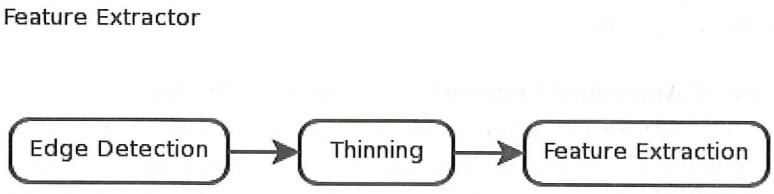

Figure 2. Expanded Feature Extractor Module from Figure 1.

Image Acquisition

There are many ways to acquire fingerprints for processing, matching, and storage. One way to acquire fingerprints is through finger-scan technology. Finger-scan devices can now be purchased by consumers or for business enterprise solutions. There are many forms of finger-scan devices which offer a variety of packages including hardware, software, and stand-alone solutions. Many finger scan systems include image acquisition hardware, image processing components, matching components, and storage components. Each finger-scan device is different, and each of the components may be located in different places. Finger-scan devices are often integrated within other technologies such as software applications, automatic door locks, and mobile phones, but they can also be used to create databases for law enforcement and national security organizations.

It is important to have high quality fingerprint images in order to accomplish proper edge detection, thinning, feature extraction, and matching. Poor-quality of acquired samples greatly reduces the accuracy of the AFIS. Fingerprint scanning devices are capable of capturing images of over 500 dots per inch (DPI) which is the standard for forensic-quality fingerprint identification, but many devices only produce images around 350-400. This produces a problem since captured images from different devices often need to be referenced using the same algorithms and technologies. One way to implement quality control in the AFIS is by including multiple samples in hopes that many of the problems associated with poor-quality samples in the system will be alleviated.

Edge Detection

The purpose of edge detection in AFIS is to significantly reduce the amount of data found in a fingerprint image and leave only the most

important information. Edge detection works by finding points on an image where the gray scale value changes greatly between pixels. If we consider edge detection in a one-dimensional array of gray scale values where an edge is present, it might look like Figure 3. This illustrates an obvious contrast in gray scale intensity. The darker pixels have low gray values while the lighter have high gray values.

Figure 3. Example of One-dimensional Gray-scale Image to Illustrate an Edge.

One method of performing edge detection is based on convolution. Convolution is a mathematical way of blending one function with another to produce a result expressing the amount of overlap the functions have on one another. Two of the most common edge detection filters are the Laplacian and the Canny operators. The Laplacian operator is a method of edge detection based on taking the second derivatives of the gray intensity (in the Cartesian coordinate system) while the Canny operator uses the first derivative of the intensity. The Canny operator is the most commonly used method for edge detection in AFIS since there are no significant advantages in other systems. The Laplacian function is shown in Equation 1.

$$L(x, y)=\frac{\partial^2 f(x, y)}{\partial x^2}+\frac{\partial^2 f(x, y)}{\partial y^2}$$

Equation 1. The Laplacian function which expresses the second derivative of a function.

There are some problems with using the Laplacian, since it is especially prone to picking up features which are not actually edges in the image. The Laplacian operator results in incorrect readings where the gray value changes in small amounts consistently over part of the image. To reduce this noise in an image, a Gaussian blur is often applied before the Laplacian operator.

After the second derivative is found, a threshold must be applied

to determine actual edges. More noise is produced with a lower threshold while a high threshold may miss some edges. Figure 4 shows the application of the Laplacian operator after a Gaussian blur has been applied. This example was created using the CIMP image editing software.

Figure 4. Example of the Laplacian operator applied to image after Gaussian blur.

Thinning

The purpose of thinning is to preserve the fingerprint minutiae shape while eliminating the extra information, which is of no use. After applying the thinning filter, the skeletal remains of the curves, only one pixel wide, are left. There are four main conditions dictating which pixels can be neglected. The neighborhood of a pixel *w* is defined as a 3x3 pixel area surrounding pixel *w*. Thinning is accomplished by using an iterative algorithm to turn off pixels by checking the neighborhood of the pixel in question and verifying that the four conditions are met. See Figure 5 for an illustration of thinning.

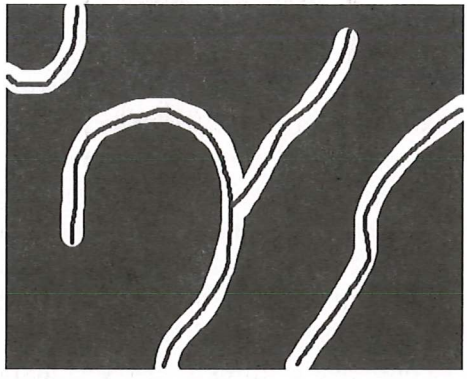

Figure 5. Artificial example to illustrate thinning where thick lines are condensed into thin "skeleton-like" lines.

A summary of the necessary conditions to negate a pixel will be provided based on Definitions 1 and 2; the actual mathematical conditions are shown in Conditions 1. The first condition eliminates the possibility of negating an isolated pixel or one that is completely surrounded. The second condition makes sure the object being thinned does not get shorter. The third and fourth conditions guarantee the algorithm does not disconnect skeletal segments within objects. These conditions all ensure that the sample is properly thinned without losing valuable information.

Definition 1: ZNZT *(x)*. Pick any pixel *p* on the boundary of *x*. Move along the boundary in the sequence P_{NW}, P_{W}, P_{SW}, P_{S}, P_{SE}, P_{E}, P_{NE}, P_{N}, P_{NW} where the subscript denotes given direction of the desired neighboring pixel. Count the number of times the boundary pixel switches from on to off.

Definition 2: NZN *(x)* is the number of neighbors of the pixel *x* which are on.

1. ZNZT *(x)*=1
2. 2≤NZN *(x)*≤6
3. (ZNZT ($P_{}$)≠ - 1) OR ($P_{,,}$, $P_{}$, $P_{}$ are all on)
4. (ZNZT (P^{N}_{W})≠ - 1) OR (P^{N}_{N}, P^{W}_{W}, P^{E}_{S} are all on)

Conditions 1. The above are the conditions necessary to turn a pixel off during thinning

Feature Extraction

Once the fingerprint image is thinned, artifacts are removed from it to improve extraction accuracy. Artifact removal algorithms typically look for anomalies like adjacent minutiae, intersecting perpendicular edges, and statistically impossible minutiae. After artifacts are detected and removed, the extraction of certain minutiae can begin.

As many as 150 minutiae types exist. The most common types are (1) ridge ending, (2) bifurcation, (3) lake, (4) dot or island, (5) crossover, (6) spur, (7) and independent ridge. Even with this limited set, minutiae recognition and extraction becomes difficult. Therefore, extraction is sufficiently limited to only two features as also dictated by practicality: ridge endings and bifurcations. The ridge ending is an abrupt stop to the ridge. The bifurcation is one ridge forking into two ridges. These two features are simply line contours that are easier to pick out accurately. In order to automate the recognition of these two features, the recognition program must be taught to accept an input pattern as a feature or a non-feature. This training process is done through the simulation of a neural network comprising of layers of perceptrons. In effect, this network of multilayered perceptrons guides a minutiae recognition program to make desirable scans.

The Rosenblatt Perceptron

The perceptron model grew from the need to extend simple neuron systems. Most limiting was the fact that the early neuron models accepted only binary inputs. In addition, the input weights were excluded from the evaluation of the function. Thus, in 1958 Rosenblatt introduced the concept of a single perceptron, in order to resolve the issues of limited input and unused weights.

Anatomy of a Perceptron

A perceptron is an automic system which can be taught to understand a concept. It learns by being exposed repeatedly to examples of what a concept is and what a concept is not. More thoroughly, the teaching process requires the input of examples paired with desired outputs. The input examples are real values that signify a meaning in some context. Then, the training set can be defined as $Dm=\{(e1,d1), (e2,d2), \ldots, (em,dm)\}$, where m denotes the number of examples, $e1$ through em are the input examples and $d1$ through dm are the associated desired outputs. Furthermore, a vector of weights is defined as $w1$, $w2$ through wm. See a representation of a perceptron in Figure 6.

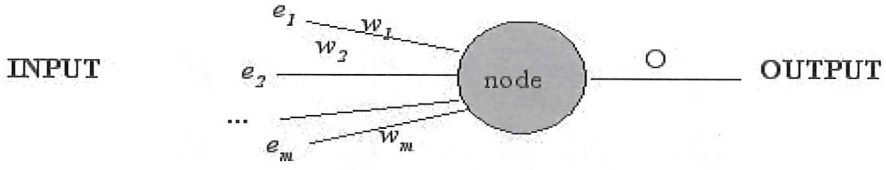

Figure 6. An *m*-variable Input Perceptron Model.

To create a mathematical equation, a linear combination of the inputs and weights occur. The weights are applied to the corresponding input values. The products of weighted inputs are then summed. This summation can be represented by Equation 2.

$$\sum_{i=1}^{m} e_i * w_i$$

Equation 2. Summation of Perceptron Inputs.

If the sum exceeds a set threshold, then the output is true. Otherwise the output is false. As indicated, the perceptron is a function which accepts real-valued inputs and evaluates to a binary output.

How Multilayered Perceptrons Recognize Minutiae

The perceptron network used in minutiae recognition consists of 3 layers. There are nine neurons in the first layer, each processing an associated element from the input vector. This first layer is simply an input layer, where no computation takes place. The second layer, also known as the hidden layer, consists of five neurons. This second layer evaluates the results of the first nine neurons. Finally, the last layer has only one neuron, acting as a single output.

The MLP is trained in off line mode, because training only needs to occur once. A set of known desirable and undesirable patterns for both minutiae are provided to the program simulating the network. Figure 7 contains training examples for the bifurcation minutia.

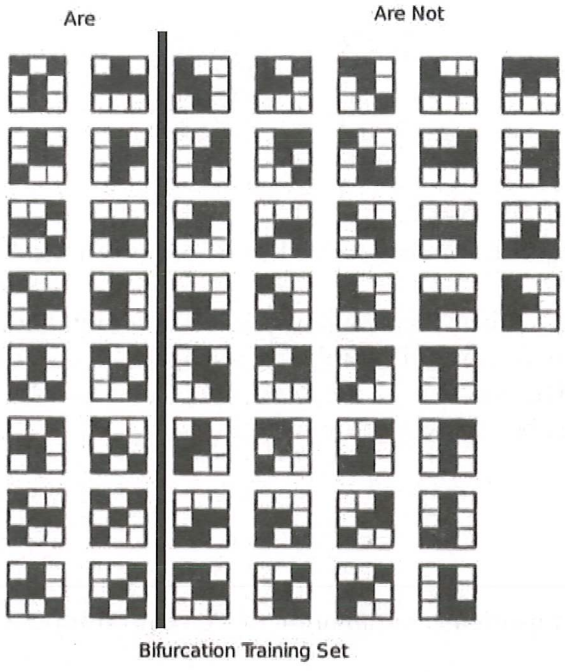

Figure 7. A bifurcation training set grouped by desired output (American University of Beirut, 2005).

Once the recognition program has been fully trained, each 3x3 pixel scan of the fingerprint image is passed to the program to identify as either an accepted minutia or not. If the 3x3 scan has centered onto an accepted minutia, an output of "1" results, otherwise an output of "0"results. For each input scan that resembles a minutiae, its position in relation to the core point of the fingerprint is recorded. This additional information, after some transformations, will be useful in the fingerprint matching process.

Conclusion

Although automated fingerprint identification systems come in various forms, there are fundamental parts that remain the same. Edge detection is vital in enhancing the quality of a fingerprint. After this enhancement is applied and the edges become distinct, the print is further thinned. Recognition works best on a thinned image, because the recognition program has sufficiently limited the domain of its parameters. Once features are recognized, they are extracted and stored

with relevant information. The extracted features are later used to compare a new fingerprint with a set of enrolled fingerprints already stored in a database. If the recognized features match, the new fingerprint can be identified and associated with an individual.

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High School Counselors' Influence

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Key Words: College freshmen, school counselors, high school, adequately prepared

Abstract
Many college freshmen feel they are inadequately prepared to enter college due to a lack of guidance from their high school counselors. This study investigated comparative attitudes about the influence of school counselors on students by surveying 60 male and female freshmen at a Midwestern university. It was hypothesized that more males than females would feel that they were not adequately prepared for college by their high school counselor. Results supported the hypothesis that more male than females students felt they were not adequately prepared for college by their high school counselor. Implications for practitioners and future researchers are that there is a strong need to inform schools, counselors, and parents that school counselors need to take part in professional development that will better prepare students to enter college.

Introduction

Less than half of students entering college actually obtain a degree, and only about one-third of college freshmen re-enroll for a second year (Hoyt, 2001). These statistics create a growing concern considering the commitment of resources, time, and energy that students, parents, faculty, and staff devote so students can attend college and earn a degree. In addition, students experience psychological costs including frustration, failure, and lowered self-esteem (Alexitch, 1999; Leon & McNeill, 1986; Rosenbaum, Miller, & Krei, 1996). Many college freshmen feel they are inadequately prepared to enter college due to a lack of guidance from their high school counselors. The more prepared students are for college the more likely they are to graduate (Mau, Hitchcock, & Calvert, 1998; Pyne, Bernes, Magnusson, & Poulsen, 2002; Alexitch, Kobussen, & Stookey, 2004; Bardick, Bernes, Magnusson, & Witko, 2005). School Counselors are certified/licensed professionals who deliver comprehensive school counseling programs encouraging students' academic, career, and personal/social development; helping all students in maximizing student achievement (American School Counselor

Association, n.d.). We examined literature and surveyed the comparative attitudes of college freshmen students regarding high school college preparation from their school counselors.

Literature Review

The current, relevant issue is whether or not college freshmen are prepared for college by their high school counselors. A lack of college preparation results in students spending more time and money than necessary to complete their college education. In research reviewed on this topic examined what high school students perceive to be the expectations of their counselors and other influential persons. The expectations of the students regarding the types of preparation for college they receive are also important to consider. Several studies suggest that students are not being provided with the expectations for post secondary education, which students find necessary. It is also important to involve the students' parents in the process of preparation. This can help parents understand how they can help their child as well as what resources are available (Mau et al., 1998; Pyne et al., 2002; Alexitch et al., 2004; Bardick et al., 2005).

Mau et al. (1998) found that one of the most important tasks in school counseling is to facilitate students' educational and vocational development. This study examined high school students' postsecondary plans and what they perceive to be the expectations of the counselors and other influential persons'. The results of the study found that over 50% of 10th grade students thought their counselors expected them to go to college; by 12th grade that percentage had increased.

Pyne et al. (2002) found that including students in career needs assessment creates a more effective career program design. Most students discuss their career plans with their parents instead of school counselors. The study involved students in grades 7-12 who participated in the Comprehensive Career Needs Survey. This tool consisted of questions evaluating career education and support needs within each participating school. Results of the study indicated that implementing earlier instruction would enable students to progress to more advanced career exploration in the older grades, which might involve greater career development.

Alexitch et al. (2004) determined that students may not have the opportunity to receive guidance specific to their needs, abilities, and interest. The study found that for students intending to go to college, school counselors provided information concerning funding, application

procedures, institutional options, and what students needed to fulfill their goals. These counselors also provided encouragement and knowledge of the academic demands of college to all students who were unsure of attending post-secondary education. Ironically, students who had full intentions of attending college did not receive any academic expectations from their school counselors. The study noted that teachers provided students with more details about institutional and program options than did school counselors. Less than half the students in the study had actually met with their school counselor.

Bardick et al. (2005) examined parents' perceptions of available career planning programs, services, or resources by having parents assess the career needs of junior high and senior high students. Surveys were completed by 765 junior high parents and 337 senior high parents and consisted of 4 questions: 1. How prepared is your child for their next career step?; 2. What role do you think you have to play in helping your child?; 3. What would help you better fill that role?; and 4. What gaps in services, programs, or resources would help your child? The majority of the parents felt that their child was somewhat or not at all prepared for career planning.

Based on the literature, career preparation programs are more effective when students actually take part in developing programs. In addition, the type of college preparatory information school counselors provides their students with is crucial to students' decisions in whether or not to further their education. Students are aware that counselors expect them to continue their education; however, there is a gap between their aspirations for college and their enrollment in college prep classes. It was also found that by involving parents the relationship between home and school is strengthened through communication, which can help students be better prepared for their future careers. The current study is designed to help fill the gap by understanding how influential students' feel their school counselors were in preparing them for college. By understanding how students are prepared by their school counselors schools can develop new ways to improve current career preparation programs.

Theoretical Framework

The theory used in this study is the Social Learning Theory, developed by psychologists Julian Rotter and Albert Bandura (Strong, DeVault, & Cohen, 2005). This theory emphasizes the role of cognition in learning; human develop through interactions within culture, society, and the family. This theory would predict that the influence of peers,

teachers, and parents affects a student's attitude toward what they believe their school counselors are capable of regarding college preparation. It is hypothesized that students' relationships with their school counselors affect preparation for their college career and their ability to graduate.

Purpose

The purpose of this study is to examine the research question: "What are traditional college freshmen male and female comparative attitudes regarding how influential high school counselors were in preparing them for college?" It is our hope that the results from this study will be used by professional researchers and school counselors to improve college preparation programs for students. We also believe it is important for high school students to enter college knowing what to expect academically, financially, socially, emotionally, etc. so they will be more prepared to complete their education in a reasonable amount of time.

Methods

Participants

The site of this study was at a Midwestern university. Participants included 60 freshmen students in a *Strategies for Academic Success* class; 20 were male and 40 were female. Of the 20 males, 14 were 18 years of age and six were 19 years of age. Of the 40 females, 29 were 18 years of age and 11 were 19 years of age.

Research Design

The survey design type used in this study is best described as a cross-sectional design in that it was used to capture attitudes, from a cross section of the population at one point in time. The data collection method was self-administered questionnaires. The rationale for using this method was convenience, low cost, and the quick return of data, which was necessary due to the fast pace of our research course. The population was the university student population; our sample was male and female students in three different sections of a *Strategies for Academic Success* class. The study used a non-random purposive sample design since the study needed information from freshmen students, which the classes we surveyed were comprised of. We used nonrandom sampling in order to fulfill our sample quota in a short period of time and to ensure we would collect data from the age group desired. To ensure the ethical protection of human subjects we completed the Human Subjects Institutional Review Board (IRB) training; our study

was approved by the IRB.

Data Collection Instrument

In order to address the attitudes of university freshmen students regarding the influence of their school counselor, a survey was designed. The survey included a cover letter with an implied consent which included a description of the study, definitions of any terms not commonly known, risks and benefits, time commitment, confidentiality, voluntary participation, contact information of the research team and the supervisor, and instructions for completing the survey.

The survey consisted of two demographic questions, gender and age. We chose gender to compare groups and analyze the data. Participants were then given six closed-ended statements based on a 5-point Likert scale which measured the intensity of the respondents' attitudes ranging from one (strongly disagree) to five (strongly agree). Questions were formed by the literature and theory regarding what factors related to the college freshmen's attitudes on high school counselor's influence on students' decisions about college.

The survey instrument has both face validity and content validity. The questions and concepts addressed in the survey are literature-inspired; it was determined that they clearly connected to the larger problem of lack of college preparation by school counselors. They also addressed a broad range of student's attitudes towards their school counselors. The survey was not piloted due to time constraints.

Procedure

To collect the data for this study, the researchers approached students in classrooms on October 31, 2006. The purposive sampling design led to the surveying of classes that were made up of predominately freshmen students. Two professors were contacted prior to surveying students. Professors were emailed a copy of the survey to review before distribution to their classes. Upon entering classrooms, students were asked if they would be willing to fill the survey. After distributing surveys the researchers went over the implied consent with the students and encouraged them to keep the first two pages for their records. The researchers and professor remained in the hallway while surveys were being completed to get the most accurate information possible while maintaining confidentiality and eliminating any pressure that might be felt. A volunteer brought returned the surveys after all surveys were completed. We over sampled to ensure the target sample number in case

of missing data. When the surveys were collected, they were kept in a locked office until data analysis.

Data Analysis Plan

The data was first "cleaned" and checked for any missing data. The "cleaned" surveys were then "coded" using acronyms for each variable. The first two questions on the survey were demographic age and gender. The only independent variable was gender (*GEN*). Each survey statement was a dependent variable and given an acronym name: To determine if the participants' high school counselors played the largest role in their preparation for college as compared to the students' parents, peers, and teachers *(SLR)*, if the participants' high school counselors adequately prepared me to attend college *(SAP)*, if the participants' high school counselors influenced their choice of major *(SIM)*, if high school resources offered by students' counselors highly influenced their decision in choosing a major *(SRI)*, if participants' high school counselors' took into consideration students' values and goals regarding their potential college careers *(SVG)*, and if participants' high school counselors spent enough individual time with them addressing their college concerns *(SIT)* . To analyze the data, the data-analyzing computer program the Statistical Package for the Social Sciences (SPSS) was used. The individual was used as the level of analysis. Given that groups were compared groups based on gender, the data analysis included: Frequencies, cross-tabulations, and a reliability analysis: Chronbach's Alpha.

Results

The first analysis conducted was a frequency distribution analysis, which indicated that there was no data missing from the surveys. The Chronbach's Alpha measure of reliability was 0.904. This value indicates that the survey items were a reliable measure of our major concept. The qualitative data, comments, from the survey are reported in the discussion section.

Table 1

Cross Tabulations

SLR

GEN	SD	D	U	A	SA	Total
Male	35.0%	35.0%	20.0%	10.0%	0.0%	100.0%
Female	22.5%	35.0%	17.5%	20.0%	5.0%	100.0%

SAP

GEN	SD	D	U	A	SA	Total
Male	20.0%	35.0%	15.0%	30.0%	0.0%	100.0%
Female	15.0%	17.5%	25.0%	27.5%	15.0%	100.0%

SIM

GEN	SD	D	U	A	SA	Total
Male	50.0%	35.0%	5.0%	5.0%	5.0%	100.0%
Female	35.0%	27.5%	17.5%	15.0%	5.0%	100.0%

SRI

GEN	SD	D	U	A	SA	Total
Male	35.0%	25.0%	30.0%	10.0%	0.0%	100.0%
Female	30.0%	17.5%	27.5%	20.0%	5.0%	100.0%

SVG

GEN	SD	D	U	A	SA	Total
Male	30.0%	15.0%	20.0%	25.0%	10.0%	100.0%
Female	15.0%	22.5%	12.5%	25.0%	25.0%	100.0%

SIT

GEN	SD	D	U	A	SA	Total
Male	30.0%	10.0%	15.0%	40.0%	5.0%	100.0%
Female	17.5%	20.0%	10.0%	25.0%	27.5%	100.0%

Note. (SLR)= My high school counselor played the largest role in my preparation for college versus my parents, peers, and teachers; (SAP)= My high school counselor adequately prepared me to attend college; (SIM)= My high school counselor influenced my choice of major; (SRI)= The high school resources offered by my counselor highly influenced my decision in choosing a major; (SVG)= My high school counselor took into consideration my values and goals regarding my potential college career; (SIT)= My high school counselor spent enough individual time with me addressing my college concerns.

Discussion

Overall, results supported the hypothesis that more male than females students felt they were not adequately prepared for college by their high school counselor. Findings suggest that more females than males felt that their school counselors played the largest role in their preparation for college versus parents, peers, and/or teachers. However, similarly to Pyne et al. (2002), findings show that most students felt their parents, peers, and teachers played the largest role in college preparation, instead of the school counselor. Even though more male than female students disagreed that their school counselor adequately prepared them for college, both males and females did not feel prepared for college by their school counselors. Those students who had full intentions of attending college did not receive any academic expectations from their school counselors, which is supported by Alexitch et al. (2004).

Participants did not feel their school counselors influenced their choice of major or provided them with the necessary resources. Findings indicate that more female than male students felt that their values and goals regarding their potential careers were taken into consideration by their school counselor. This also supports the hypothesis that males would feel less prepared for college by their counselors. According to a study by Bardick et al. (2005), the majority of parents found that their child was somewhat or not at all prepared for career planning. Findings support how more females than males felt their school counselor spent enough individual time with them addressing their college concerns, which leads to students feeling unprepared for career planning. Overall, both males and females were unsure that their school counselors spent enough individual time with them addressing their concerns. However, Alexitch et al. determined that students may not have the opportunity to receive guidance specific to their needs, abilities, and interests.

The findings that were not supported by the literature were supported by the Social Learning Theory (Strong, 2005). Finds support the findings that parents, peers, and teachers of students play a more influential role, than school counselors, in the student's choice of major. More males than females disagreed that their school counselor influenced their choice of major; however, this finding shows that overall both males and females disagreed. The Social Learning Theory may explain this by giving males the impression that it is socially unacceptable for them to approach others for any form of help. This theory supports that fewer male than female students felt their school counselors

influenced their choice of major and were not provided with adequate resources to choose a major. The results show that males disagreed that the resources offered to them highly influenced their choice of major. Again, these findings may be explained by the Social Learning Theory. This theory relates to our findings since students were found to develop through interactions with their family, with parents having more of an influence on the development of their children's values and goals. As a result, school counselors play a lesser role when considering a student's potential career. Which our findings support are overall due to males disagreeing that their values and goals were considered, however that could be due to lack of time spent one-on-one with the school counselor. The findings in this study state that both males and females agreed they had spent enough individual time with their counselor; however, there is the possibility that they were discussing several other concerns that may not have been relevant to college. Our research clearly supports that there is a need for a stronger bond between students and their counselors to help in the process of furthering their education. Overall, the Social Learning Theory supports the social trend that females are more prepared than males to enter college due to their experiences with their guidance counselors.

Qualitative information was obtained in the surveys additional comment section. The majority of females had already declared a major while only a few had either changed their major or were undecided. Some females stated they never saw their counselor, and that their peers were not helped either. Some females stated their counselors influenced where they went to college and some said that their counselors made their decisions for them. A few suggestions made by females were that their school counselors needed to be more time efficient, pay less attention to troubled students, spend more individual time with them focusing on the topic at hand, and provide them with appropriate schedules making sure to cover all curricula. Some positive remarks were made by females about their counselors regarding their friendliness and exposure to their desired field of study.

The majority of males had already declared a major while only a few had either changed their major or were undecided. Some males had stated that their counselor did not even know their name while others did not feel the need to even meet with their counselors. Some males stated that their school counselors encouraged them to attend tech school versus a university to save time and money. It was also mentioned that it was difficult to establish a relationship with a new counselor after their

old counselor had been let go.

Limitations

There was an uneven sample of males and females due to not being aware of the class populations, which can lead to biased results. Another limitation is the lack of random sampling, which was due to time constraints and number of available participants.

Implications for Practitioners

The results showed that there is a need to inform schools, counselors, and parents that males are less apt to approach their school counselors to ask for assistance in furthering their education. Improvements can be made by requiring students to take a semester-long course in their last two years of high school that explores potential careers. It could also be a good idea to survey males to find out what they think would help them to be able to approach their school counselor. Schools should also require their counselors to meet with each student once each semester to address future career plans. In doing this, both males and females would have an equal opportunity to discuss their values and goals surrounding their career choices. There should also be additional training for school counselors, which would aid their ability to better prepare their students. The combination of these three goals will benefit males and females by giving them more opportunities to discuss career concerns with their school counselors.

Implications for Future Research

It is recommended that the next step of research would be to use a more diverse sample in different age groups with an even number of males and females. We feel this approach would lead to more accurate results. Another possibility that may lead to more accurate results could be to survey a larger and randomized sample to generalize to a larger population.

Conclusion

Students feel their parents, peers, and teachers play the largest role in their college preparation instead of their school counselor. There are students that do not even receive any academic expectations from their counselors regarding college. There is a need for a stronger bond between students and their counselors to help in the process of furthering their education.

As a result of this study, it is hoped that males will feel more comfortable approaching their school counselors to discuss their future career plans. Also we would like people to recognize that school counselors are not adequately preparing students to further their education after high school in today's society. It is encouraged that action be taken to better prepare school counselors to address the needs of their students.

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Potential Pathogens in the School Environment

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Key Words: Microbiology, School Health and Sanitation, Bacterial and Non-bacterial Pathogens

Abstract
Pathogenic microorganisms are potent threats to school health. In this experiment, Colony Forming Unit (a viable bacterial colony count) samplings were taken, in various regions of a school, of microorganisms (Staphylococcus aureus, various aerobic bacteria, and molds) in order to find a pattern of distribution between the colony count and the environment. Fifteen hall passes were sampled from three regions of a school, and then categorized into groups A, B, and C (each of five hall passes). It was hypothesized that regions near entranceways would contain more molds (Group A), regions in the vicinity of lavatories would contain more mold and yeast (Group B), and regions with most students would contain more Staphylococcus aureus and aerobic bacteria (Group C). Data overall supported the hypothesis: Group A registered a large count of mold, and Group B surpassed all other regions in the count of both mold and yeast colonies. Furthermore, Group C showed significantly more Staphylococcus aureus and other aerobic bacterial colonies than Group A or B.

Introduction

Pathogenic microorganisms are serious concerns in schools, where contact with various bacterial strains and other microorganisms occur frequently throughout the school day (Whitaker, 2005). Unlike non-pathogens, pathogens can cause disease in humans, whether bacterial or non-bacterial. Though only a small fraction of the thousands of species of bacteria and fungi are pathogenic, serious diseases can result if proper prevention and treatment do not take place. Therefore, schools must monitor strict microorganism counts in order to prevent serious outbreaks. In this experiment, the counts separate into two categories: bacterial pathogens (*Staphylococcus aureus* and aerobic bacteria) and non-bacterial pathogens (molds and yeasts).

Bacterial pathogens include *Staphylococcus aureus* bacteria and some species of aerobic bacteria. Commonly found in air and water and on human skin, *S. aureus* is known to cause pneumonia, septicemia, and

toxic shock syndrome, as well as wound infections and food poisoning. As the number of drug-resistant strains continues to grow at an alarming rate—present supplies of viable antibiotic and anti-bacterials that can be used to treat and prevent infections are being exhausted. According to research by Wertheim and Verbrugh (2006) of the Erasmus University Medical Center, "In the USA, community-acquired MRSA (meticillin-resistant *S. aureus*—bacteria resistant to meticillin, a semisynthetic penicillin) have outrun susceptible *S. aureus* infections as causes of skin and soft tissue infections (p. 368)." Furthermore, in another study conducted at the University of Celal Bayar, Turkey, three of four popular drugs (dexmedetomidine, etomidate-lipuro, and propofol) were shown to be ineffective in inhibiting the growth of *Staphylococcus aureus* isolated from hospital patients (Kele et al., 2006). In contrast to *S. aureus,* aerobic bacteria are characterized by their need of atmospheric oxygen in metabolism for survival; they are the most prevalent form of microorganism present both around the human environment and on the human body, including organisms such as *E. coli* or *Salmonella spp*. In fact, four out of the top five illnesses that keep students from school are caused by bacterial pathogens: stomach flu (gastroenteritis), ear infection (otitis media), pink eye (conjunctivitis), and sore throat from streptococci bacteria (Mayo Clinic, 2006). Together, *S. aureus* and pathogenic species of aerobic bacteria constitute a large percentage of pathogenic microorganisms.

Non-bacterial pathogens include species of mold and yeast (fungi). Molds tend to be external parasites of humans, causing ringworm, athlete's foot, and jock itch, while yeasts invade internal tissues, infecting the genital tract or activating allergies and other respiratory diseases. Commonly found in moist and dark areas, mold and yeast proliferate in entrances around the school: to hallways, lavatories, and classrooms. According to a hypothetical "safe [mold] contamination remediation project," contamination by fungi through airways and entranceway surfaces are highlighted as two of the most prevalent forms of transmission (Wayne, 2006). Also to be closely monitored, molds and yeasts make up much of the remaining percentage of pathogenic microorganisms.

Methods

Materials

*Yeast and Mold (YM) Petrifilm: 10 (1 for each sample)
*Aerobic Count (AC) Petrifilm: 10 (1 for each sample)

*Rapid Staphylococcus aureus (RSA) Petrifilm: 10 (1 for each sample)
Standard Colony Counter (Quebec Counter): 1
Micropipette (1000 μm): 1
Micropipette tips: 10 (1 for each sample)
5 mL Sterile Water Tubes with Hall Pass Swab Samples: 10 (1 for each sample)

Design

In this experiment, four different surfaces were tested: wooden hall passes, students' hand, and a bathroom door and sink. Each sample area was swabbed in a 2 $in.^2$ region using sterile swabs and then plated onto three kinds of Petrifilm. The three different Petrifilm (culture mediums containing nutrients and indicators that assist colony enumeration) used were AC, for detecting aerobic bacteria; RSA, for detecting *Staphylococcus aureus*; and YM, for detecting yeasts and molds. After incubation (48 hours at 35°C for AC, 4 days at 25°C for YM, and 24 hours at 35°C for RSA), the samples were retrieved for analysis.
* Petrifilm used was a courtesy of the local 3M Corporation.

In the assistance of a Quebec Counter, the Petrifilm samples were counted. Following standard colony count guidelines (3M), four grids of each Petrifilm sample were hand counted. The four respective numbers were averaged, and then multiplied by 20 (the number of grids on each Petrifilm sample) to arrive at the number in 1 mL in sample, and then by 5, to get the number in 5 mL (volume of the original sample), and finally by 22 (the ratio of original surface area of 2 $in.^2$ to total surface area of 44 $in.^2$ to arrive at the final count of the CFU (Colony Forming Units).

Procedure

When replicating the procedure, first, collect all samples using aseptic swabs and 10 mL tubes of sterile water. Use a sterile swab and new water container for each sample. Wearing hand gloves, remove the swab from its sterile wrap. After dipping into the tube of 10mL of sterile water, move the swab first horizontally across the hall pass. Repeat the procedure vertically across the same sample medium while slightly turning the swab, to assure greatest amount of contact. Take the swab and break the cotton end along with about 2-3 cm of the wooden stalk off. Place the swab into the 10mL container of sterile water. Do not keep samples longer than 24 hours without plating.

Second, prepare the sample for plating onto Petrifilm. Place each

10mL container sample into a centrifuge so that bacteria will settle on the bottom of the container for easy extraction. Meanwhile, arrange the needed Petrifilm: Aerobic Count Plate (AC), Rapid *S. aureus* Plate (RSA), and Yeast and Mold Plate (YM). When finished, attach a sterile tip onto the end of a micropipette. Verify that the increment on each micropipette is 1000μm, and withdraw that amount from each sample, using a new tip for each sample. Remember to continue plating onto a Petrifilm until all contents from the micropipette tip is emptied. After plating, use the marked Petrifilm spreaders (separate for AC, YM, and RSA) to spread the pipetted sample evenly upon the Petrifilm.

Third, incubate each Petrifilm sample as indicated. AC plates are to be incubated for 48 hours at 35°C. YM plates for 4 days at 25°C. The procedure for incubation of RSA plates involves several steps. After the initial 24 hours of incubation at 35°C, remove from the incubator and keep at 62°C for 2 hours. During this time, prepare to insert the TNase reactive disk. With sterile forceps, remove one round TNase disk from its outer frame. Lift the top layer of the Petrifilm and place the disk in the well of the Petrifilm. Gently apply pressure across the reactive plate area, minimizing any air bubbles and ensuring uniform contact. Finally, incubate RSA plates with disk inserts for another 2 hours at 35°C.

Lastly, count each AC, YM, and RSA plate. Adhere to the following guidelines for legal microorganism counting: *Staphylococcus aureus* should have a distinct surrounding pink hallow and be in individual round colonies, aerobic bacteria should be red in appearance and be in round clusters, yeast should be green and appear in distinct round colonies, and molds should be distinctly black or green. After identifying respective colonies, use the Standard Colony Counter (Quebec Counter) to count the number of microorganisms in four grids. Then average the four counts (divide by four) and multiply first by 20 to find the number of microorganisms present on one Petrifilm sample. Next, multiply the figure again by 5 to arrive at the number present in the original 5mL sterile water tube. Finally, multiply the number by 22, the ratio of the surface area swabbed (2 square inches) to the total surface area (44 square inches).

Results

Table 1

Microbiological Counts of AC, RSA, and YM in Groups A, B, C of 15 Hall Pass Surfaces

Group	Hall Pass	AC CFU	RSA CFU	Mold CFU	Yeast CFU
	1	2200	3300	4950	1100
	2	2750	1650	6050	0
A	3	2200	2200	6600	550
	4	3300	1100	7700	0
	5	2750	1650	7150	0
	A Average	**2640**	**1980**	**6490**	**330**
	6	4400	6050	1650	4950
	7	7700	4400	4950	3300
B	8	8800	4950	5500	4400
	9	11000	6600	3850	2750
	10	7150	6050	4400	3850
	B Average	**7810**	**5610**	**4070**	**3850**
	11	11000	16500	550	0
	12	16500	14300	1100	550
C	13	22000	13200	1650	0
	14	19800	11000	550	0
	15	20900	10450	0	0
	C Average	**18040**	**13090**	**770**	**110**

Note: All of the figures above are in CFU units and are the finalized tabulations.

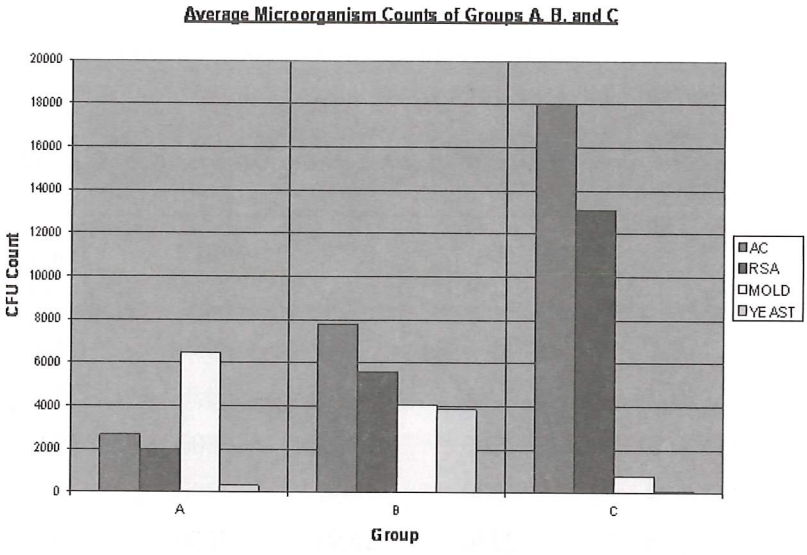

Figure 1. Bar graph of average microorganism counts of all groups.

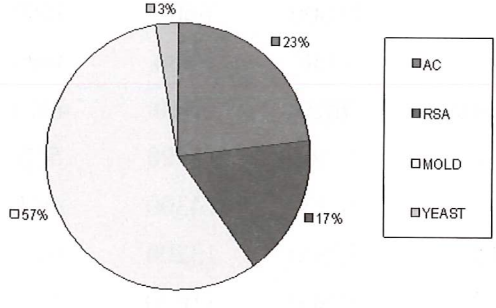

Figure 2. Pie chart of microorganism distribution for Group A hall passes.

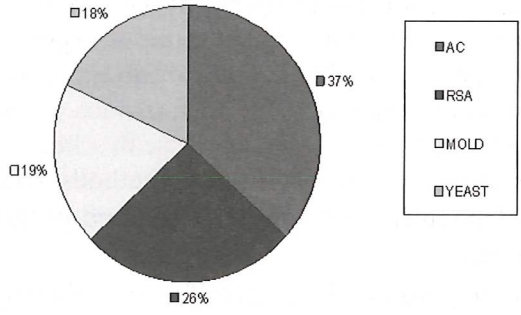

Figure 3. Pie chart of microorganism distribution for Group B hall passes.

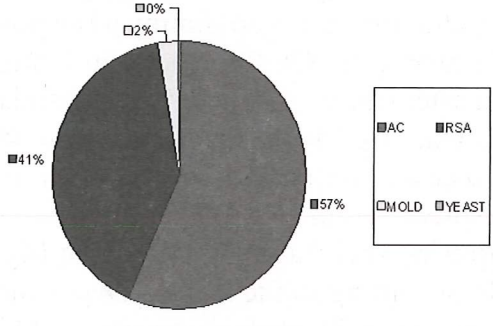

Figure 4. Pie chart of microorganism distribution for Group C hall passes.

Discussion and Conclusion

According to the final tabulations, the original hypothesis concerning the relationship between regions and counts was supported. Group A, regions near entranceways, had a higher percentage and count of mold than Group B and C, 57% and 6490 CFU, respectively. Moreover Group B, regions near lavatories, showed greater counts and percentages of both mold and yeast: 19% and 4070 CFU for mold, and 18% and 3850 CFU

for yeast. And finally, Group C, regions with the most students, displayed a significant count of *Staphylococcus aureus* and other aerobic bacteria: 41% and 13090 CFU for *S. aureus,* and 57% and 18040 CFU for aerobic bacteria. Evidently, the three different counts (AC, YM, and RSA) varied greatly depending on location and the amount of exposure to students.

Thus with the presence of hundreds and thousands of potentially pathogenic microbial colonies upon a single surface, prevention of infections and illnesses remains a serious issue in schools. But with careful considerations and stringent control methods, school microbial colony counts of bacteria and fungi and related pathogens can be kept under control.

Bacterial pathogens can be controlled by adhering to simple hygiene regulations and infection prevention guidelines. General aerobic bacteria should also be given careful consideration to prevent outbreaks. As stated by Mayo Clinic (2006) on Children's Health, "[Parents] can prevent the spread of illness by not sending a sick child to school" or treating their children with antibiotic therapy (p. 16). Moreover, good personal hygiene and proper hand-washing techniques can also diminish the possibility of aerobic bacteria outbreaks. On the other hand, *Staphylococcus aureus* infection rates can be controlled by transmission limits. Sarah Huang, a Harvard Medical School researcher, found that even staying in a clean room previously occupied by someone with MRSA (a widespread strain of *S. aureus* bacteria) may increase the odds of acquiring such bacteria (as cited in Myron, 2006). Thus in schools, according to the Illinois Department of Public Health on prevention of *Staphylococcus aureus*, "high-touch surfaces (e.g., doorknobs, light switches, drinking fountains, faucet handles, and surfaces in and around toilets) [should be] cleaned daily" (Whitaker, 2005). Additionally, items that are visibly soiled with blood or other body fluids are to be cleaned with chlorinated bleach (1:10 dilution) or other germicidal products.

Fungal pathogens and mold contamination can also be solved. Under a method approved by the Centers for Disease Control and Prevention, effective mold remediation can be carried out with sanitization and a thorough air conditioning system using a high-efficiency particulate air (HEPA) filter (Wayne, 2006). Also, yeast

infections may be managed by treatment with certain antibiotics, such as those derived from the bacteria *Streptomyces norsei*, which contains antifungal properties that are used to treat vaginal yeast infections.

Because of the growing presence of microorganisms and pathogens in the school environment, schools today must be vigilant for pathogenic microorganisms. As more pathogens mutate and countless new strains are created, students and faculty are more at risk than ever. But as research continues to explore new venues of treatment and prevention, the prospect of minimizing pathogenic presence remains bright.

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Ultraviolet/Electron Beam Inks Modernize Packaging

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Key Words: Ultraviolet, E-beam, UV/EB, UV, EB, Ink technology

Abstract
Ultraviolet/Electron Beam (UV/EB) technology is changing the ink industry rapidly. As the technology continually improves and expands, it will soon overpower traditional ink systems. The cost of UV/EB materials and machinery are coming down because the volume is going up. There is also a reduction in operation costs when switching to this technology. UV/EB inks are better for the environment than most conventional ink systems because they reduce energy and do not emit volatile organic compounds (VOCs). They have a quick turnaround rate due to the quick cure and fast press speeds, as well as they improve the overall performance by enhancing mechanical properties and providing a better shelf appeal.

Introduction

Magazines, compact discs, credit cards, automotive headlights and dental fillings; there is some sort of Ultraviolet/Electron Beam (UV/EB) technology everywhere. With the rising demands of environmentally friendly packaging, UV/EB inks are becoming very popular. Figure 1 (below) shows how UV/EB ink usage has grown since 1995.

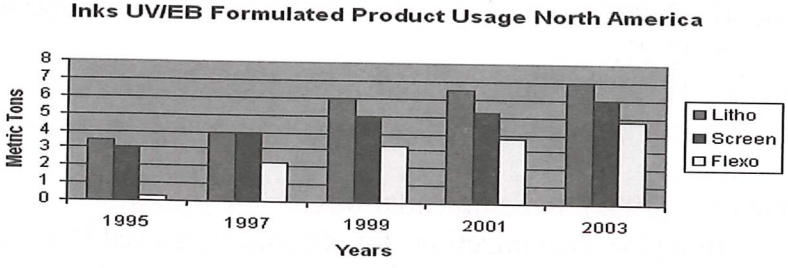

Figure 1. Ink Usage in Previous Years (Cohen, 2004).

There are four main points that demonstrate why these inks will continue to see increased usage in the industry. They reduce overall cost, are better for the environment, save time, and have overall better

performance with shelf appeal and physical properties.

Background

UV/EB inks have been around since the 1960's. While having become widely accepted, they are still considered "new" technology. Most conventional ink systems need to go through a drying process by either absorbing, evaporating the excessive ink, or a combination of both. UV/EB inks go through a different process called "curing." Utschig (2004) describes curing as the chemical reaction that a material goes through to get from the wet to the dry stage. UV and EB are two separate types of curing as shown below in Figure 2.

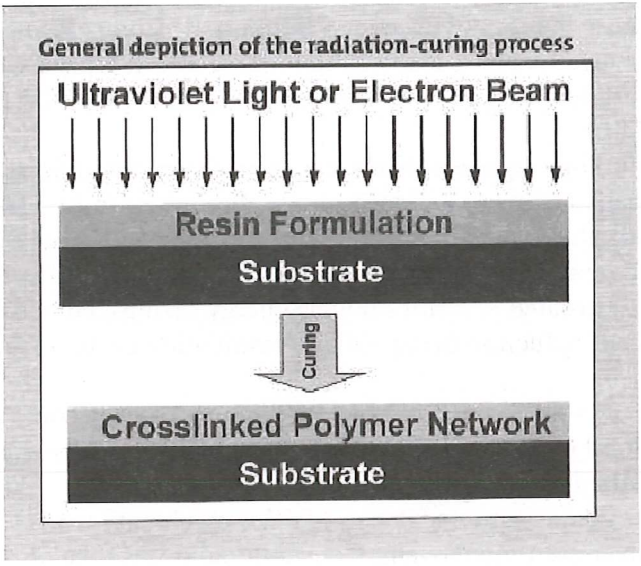

Figure 2. Radiation-Curing Process (Miller, 2005).

UV curing uses "high-intensity UV radiation to start the free-radical cross linking of the prepolymers and acrylate oligimers" (Utschig, 2004, Section 2, ¶ 1). The light is absorbed and converted into free radicals, which cause the ink to polymerize. EB curing uses a beam of electrons instead of the UV photo-inhibitors to cause the same reaction. The first reason these technologies may see increased usage is that they reduce cost.

Reduces Cost

UV/EB inks are considered to be very expensive. Biro and Sanders

said it best by stating, "you get what you pay for" (Biro & Sanders, 2004, p.55). This technology is still new and in years to come the price should drop to compete with other ink systems. This is because the volume of these inks has grown. Podhajny (2005) says that these technologies have reached a mature point, and that the prices should be going down. While still somewhat costly, there are some cases when using this technology could actually reduce cost; such as lower equipment and operation costs.

Lowers Equipment Cost

The equipment cost for UV/EB inks were not always as low as they are today. Because the technology is growing, the price has gone down significantly. EB capital costs can allow companies to research other ideas, "Because the capital costs of EB units have come down, many packaging converters have also begun looking at using EB for the web printing of folding cartons and flexible packaging" (Pianoforte, 2005, Section 2, ¶ 10).

EB technology equipment cost has gone down dramatically, but the cost can also relate to UV technology. According to RadTech International North America (2005), "As a result of these energy efficiency advances, the study notes that the savings offered by UV/EB technology translated into not only big energy savings, but also as much as a 55 percent reduction in capital and installation costs" (Section 1, ¶ 2).

Because of this cost reduction, UV/EB curing has become a viable option for food packaging applications, which include adhesives, coatings, and inks (Lin, 2006).

Another item is equipment size. UV/EB machinery tends to be much smaller than conventional ovens. Conventional ovens take up around 500 to 1,000 square feet. At a floor space cost of $0.50/ft2/month, it will cost roughly $3000-6000 per year in comparison to UV machinery, which only takes up about 50 to 100 square feet (RadTech International North America, n. d.). This is a significant difference.

Although these statements show that the cost of the equipment has gone down, the question is, will these savings get passed down to the end-user? That is a question that only the converters can answer.

Lower Operation Cost

Operation cost is a main concern for many companies. By using UV/EB inks, a converter can cut their costs extremely. Fontelera (2005) states that "this technology lowers overall operation cost by 10 to 20 percent by

eliminating the lacquering step, one film layer and laminating adhesive" (Section 1, ¶ 3). She continues by saying that they can have a 20 to 30% cost savings by having the print substrate double as the release substrate. There is a cost savings through the reduction in the number of laminate layers (Lapin, 2006).

Another reason these technologies lower operation cost is they can be placed in-line. EB inks do not require an inter-station for curing, which increases efficiency, speed, and cost savings (Fontelera, 2005). It allows converters to "start with a roll of paper or plastic film at one end of the press and produce individual packages or rolls of printed/coated matter at the other end, which can be slit in line and then immediately shipped out to the customer" (Biro & Sanders, 2004, p. 54).

This process also reduces the need for print job re-runs because the prints can be seen instantaneously (Pianoforte, 2005). Every production line should have a quality check. If the quality of some parts of one run is not online with specifications, those parts can be removed and the run can be extended to make up for them. With a conventional system, a converter will have to wait until it is dry to see the quality, which can take many days. If the specification is off, they will need to restart the print run and create more to make up for the loss. This takes time and money, and also causes waste.

These cost savings usually offset the slightly higher costs of the actual material. Because of reduced operating costs, the support for the growth of UV/EB inks continues. But costs are not the only driving factor for these inks, helping the environment is a great seller for UV/EB.

Better for the Environment

The first thought that comes to mind when discussing UV/EB inks is that they are bad for the environment. In fact, the exact opposite is true. RadTech, which is an Association for UV/EB technologies, was awarded the 17th Annual Clean Air award in 2005 (Cohen, 2005). Because these inks are more environmentally friendly, several states encourage the use of these technologies. Some even have financial incentives, which include reducing taxes of companies that utilize them (Biro & Sanders, 2004). These inks are better for the environment than conventional ink systems for a couple of reasons, they reduce energy and they do not submit volatile organic compounds (VOCs).

Reduces Energy

Packaging converters are always trying to find ways to reduce energy,

especially after Hurricane Katrina hit in the fall of 2005. In one study, a US manufacturer found an 80% reduction in the total amount of energy used compared to a conventional system (RadTech International North America, 2005). One of the main reasons companies want to reduce how much energy they use is because it saves money.

RadTech International North America (n. d.) breaks down the cost savings when reducing energy. They said when using a conventional (solvent or water-based) system, an average of about $44,736 per year is spent. In a typical system, the dryers use elevated temperatures to evaporate either the solvent or moisture. There also needs to be a high airflow to aide in the removal of the solvent/moisture from the substrate and the oven. Afterwards, there are chill rolls or air blowers used to cool down the substrate (Sanders, 2006). The $44,736 accounts for both the ovens and the cooling system. When using an electric UV system, only $22,560 was spent in a year (RadTech International North America, n. d.).

No VOCs

Another reason EB/UV inks are good for the environment is that they give off fewer and sometimes even no VOCs. These are emitted as gases from some sort of solid or liquid: "VOCs include a variety of chemicals, some of which may have short- and long-term adverse health effects" (Environment Protection Agency, n.d., Section 1, ¶ 1).

VOCs affect the ozone layer, which the EPA estimates is the third largest contributor to climate change. Many try to eliminate VOCs by incinerations, but in turn generate greenhouse gases (RadTech International North America, 2005). These types of gases can be generated by nature, but most are caused by human activities, including carbon dioxide and methane gas (Environment Protection Agency, n.d.).

Another plus of not having VOCs is it allows converters to avoid permits that are normally required to maintain or expand their operations (Pianoforte, 2005). Solvent printers need an air scrubber that cleans the fumes through a charcoal filter every 5-10 seconds. This means that the solvent printer will have to be placed in a separate room with vents that take the fumes out of the building (Leesemann, 2006). UV/EB ink systems can be placed in the same room, since fumes are not an issue, allowing them to be placed in-line.

Not only do UV/EB inks pave the way to a better environment, but they also allow for a quicker turnaround rate.

Quick Turnaround Rates

Quick turnaround rates go hand-in-hand with cost savings. Typically, the faster the converter can develop and release the product to the customer, the less expensive it becomes. That is why many companies press for this. There are two reasons that UV/EB technologies have a quick turnaround rate; quick curing and faster press speeds.

Quick Curing

Using UV/EB curing of inks is a very efficient process. They are known for the "quick cure." As stated by Biro and Sanders (2004), "you start with a mixture of monomers, oligomers, resins, colorants, additives and photoinitiators (for UV) to form a crosslinked 'photoset' matrix with incredible properties…Converters like to use UV and EB chemistry because it generates an instantly cured or set film of ink" (p. 53).

Pianoforte (2005) explains that instantaneous drying is one of the most notable benefits of using energy-cured inks. It speeds up the manufacturing process and allows for faster finishing and shipping: "This instantaneous curing improves job turnaround, allows quicker secondary conversion which reduces inventory" (Pianoforte, 2005, Section 3, ¶ 1).

Faster Press Speeds

Because this technology has quick cure, the equipment can be placed inline. As previously stated, there is no inter-station curing. In a traditional ink system, the material is printed in a separate room and it is given time to cure. Once it is dried, the material will be placed back on the line to finish the converting process. Because the ink stations for UV/EB are placed in-line, it allows the converters to do other post-printing operations in-line as well, such as embossing (Podhajny, 2005).

The inks are also easier to clean. Leeseman (2006) stated, "since the inks cure by UV light, the ink does not dry on the heads like solvent inks" (p. 24). Companies that use solvent inks are constantly cleaning the print heads and trying to keep them moist; "in the morning with the UV-curable printer, we quickly wipe, push a little air through, then run a test print and we're ready to go" (Leeseman, p. 24).

UV/EB inks can be printed directly on any substrate. This is great news for companies that use rigid substrates: "Water-based and solvent-based inks do not adhere well to rigid substrates" (Leeseman, page 23). Because of this, these inks need to be printed on a flexible material that has an adhesive back. They also need to be cut, lined, and mounted (Leeseman, 2006).

Overall Better Performance

UV/EB technology is known for their graphics and print quality. Many companies may use them because of these reasons alone. They enhance properties and have better shelf appeal.

Enhance Mechanical Properties

UV/EB inks improve many properties of the finished product such as fade resistance, scuff resistance and heat resistance.

The Scotts Miracle-Gro Company has used this technology for many years now. As most of their products are placed outdoors, they need to have excellent fade-resistance. With the traditional ink systems placed outdoors, the colors would fade within a week, but when using UV/EB inks, the colors would last up to three to four months in direct sunlight. This was enough to last an entire lawn/gardening season. Leeseman (2006) discusses fade-resistance indoors, "UV inks are fade resistant for three-plus years and when printed on outdoor materials are waterproof" (p. 24).

Scuff resistance, also known as abrasion resistance, is another big plus of UV/EB inks. This allows products to go through distribution without showing much damage from being moved around, such as scratches.

Another functional property that UV/EB inks have is heat resistance. Lapin (2006) mentioned that this affects the heat seal of the packaging. Conventional inks tend to "pick off" of the substrate under conditions of high heat and pressure.

Visual

One notable benefit of UV/EB inks is the shelf appeal: "When it comes to packaging for the company's Xbox product, a paperboard sleeve with a matte green-and-black color scheme plus ultraviolet curing of the pack's carton helped provide shelf appeal at a reasonable cost" (Butschli, 2004, Section 1, ¶ 5). This could include the bright colors, the glossy look, and printing advantages.

The bright color of these inks is due to the fact that they are highly pigmented. Traditional ink systems either have water or solvents mixed in with the pigments to make the ink. But with UV/EB technology, the inks are 100 percent solids. This means they will not be diluted with the water or solvents. Because these inks are not diluted, the same amount of ink will not have to be applied to the substrate. This translates into another cost savings.

One of the most notable shelf appeals of UV/EB is the "glossy" look, "UV and EB technology has enabled The Scotts Company to differentiate ourselves from our competitors in the market," said Haynes "The technologies deliver gloss and edge-to-edge printing [that compares favorably] to surface printing, which is not as glossy" (Butschli, 2004, Section 1, ¶ 7, as cited in Haynes, 2004).

Lin et al. (2006, Section 4, ¶ 3) explains, "In the graphic art/print finishing area, specialty and surface effect UV coatings such as integrated labels, printable magnets, pseudo-embossing, and foil-like surface effects have been catching the attention of designers, printers, and end-users."

UV/EB printing is comparable to gravure, which is known for its print quality (Rangwalla, 2006). One of the reasons that the print quality is superior is because the inks have a high viscosity. The dots do not spread out before they are cured. The ink dots could be placed on the substrate on a Friday and on Monday the dots would still be in the same spot to be cured (Schrew, 2006). This means that the inks are not likely to move during production, which will cause less quality issues.

Conclusion

EB/UV technologies are used for magazines, compact discs, credit cards, automotive headlights and dental fillings. There are many reasons these inks are revolutionizing the ink industry, which include cost reductions from equipment and operations; they are better for the environment because they reduce energy and have little or no VOCs; they have quick turnaround rates due to quick curing and faster press speeds; and they have overall better performance because they enhance properties and provide a better shelf appeal.

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Effects of Methamphetamine Use on the Children of Users

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Key Words: Methamphetamine, child abuse, addiction, protective services

Abstract
Methamphetamine use among users with children is becoming an epidemic in society. This study examined attitudes regarding primary caregiver methamphetamine use and the effects on their children by surveying approximately 20 Alcohol and Other Drug Abuse (AODA) counselors located in Western Wisconsin. It was hypothesized that AODA counselors would consider methamphetamine use as child abuse and believe families should remain intact while efforts are being made to overcome the addiction. Results indicated that the majority of participants believe that primary caregiver methamphetamine use is considered child abuse and that such occurrences should be reported. Many of those surveyed felt that children and caregivers should remain united or be reunited if children had previously been taken into protective services. Implications for future researchers would be to develop a broader survey instrument and use a larger sample. Practitioner implications include supporting more education and new legislation to address these problems and create additional family preservation programs.

Introduction

In 2005 it was reported that 1,660 children living in or visiting residences where methamphetamine was being produced were negatively affected by methamphetamine, injured, or killed. Methamphetamine is a drug derived from amphetamines that affects the central nervous system. The drug ranges in colors and can be in powder or rock form depending on whether it is to be smoked, injected, ingested, or snorted. The use of methamphetamine is becoming a very prevalent problem in today's society. Children of caregivers who use and/or make methamphetamine are at risk for physical and sexual abuse, neglect, fires and explosions, medical problems associated with chemical contact, and exposure to hazardous lifestyles (Office of National Drug Control Policy, 2006). Drug Endangered Children (DEC) programs are being established in many states. The program unites law enforcement, medical, and social

service professionals to tend to the needs of children who are exposed to homes where methamphetamine is being made and/or used (Altshuler, 2005). There is limited research on the exact effects that primary caregiver methamphetamine use has on children and the issues related.

Methamphetamine is a controversial topic among professionals, which makes agreeing upon a method of treatment for persons with a methamphetamine addiction, and their family, difficult. The purpose of this study is to examine the attitudes of Alcohol and Other Drug Abuse counselors (AODA) on the effects of primary caregiver methamphetamine use on the children of users. It is hoped that this study will be used by professionals in the field to find more effective ways to help and preserve the families as well as treating people with the addiction

Literature Review

Methamphetamine use is a fairly new concept and nearly all the research available has been completed within the last few years. There is very limited literature on information regarding the effects of the drug on people who use methamphetamine and even less on the effects on the people around them, most importantly their children. The literature prevalent to this study suggests that the use of methamphetamine in men and particularity women at childbearing age is rising and becoming an epidemic. There are many problems associated with methamphetamine use that would relate to how a primary caregiver could adequately care for their young, resulting in a need for child protective services to come to the aid of these children (Altshuler, 2005; Semple, Grant, & Patterson, 2004; Brecht, O'Brien, Mayrhauser, & Anglin, 2004; Derauf, Katz, Frank, Grandinetti, & Easa, 2003).

Child welfare recently started recognizing the needs of children taken from "methamphetamine homes" and that collaboration among community services is crucial to meeting those needs (Altshuler, 2005). A cross-sectional study found a significant increase in the importance of collaboration. Based on this study and the lack of information found on the needs of drug-endangered children, it can be concluded that more research on the effects of methamphetamine use on children exposed to the substance is necessary to find efficient collaborative strategies in dealing with the issue.

Semple, Grant, and Patterson (2004) found that methamphetamine use in women has been escalating. The study focused on reasons why women use methamphetamine; among the reasons were weight loss, self-

confidence, enhanced energy to keep up with the demands of childcare and household chores, and increased sexual pleasure. Based on the findings, children of the mothers who use methamphetamine are likely to be exposed to many high-risk situations which could lead to child abuse and/or neglect.

Another study found that 71% of methamphetamine users were found to be parents (Brecht, O'Brien, Mayrhauser, & Anglin, 2004). Females were found to be introduced to the drug through partners more often than men, which could indicate how drug use and the family are incorporated. It is likely that the well-being of many children are threatened due to vast number of parents that use methamphetamine.

Derauf, Katz, Frank, Grandinetti, and Easa (2003) hypothesized that the prevalence of methamphetamine use in pregnancy was higher than it actually is. Research at a hospital in Hawaii found that only a very small percentage of newborns delivered actually tested positive for the substance. Researchers attributed the lower than expected finding to the notion that women who plan to continue their pregnancies to term reduce or prohibit their intake of any drug until after the birth. Based on the findings from this study, although many women may limit the use of methamphetamine during pregnancy, there is still a small percentage of children who have been exposed and are in danger of continued exposure, which can contribute to the difficulties children may have contracted before birth.

What little is known about methamphetamine suggests that the drug impairs users from efficiently performing routine daily activities. This includes anything from being able to keep a job to provide for a family to having the mental stability to care for a young child. The current study will look into the distorted functioning of a primary caregiver on methamphetamine.

Theoretical Framework

The theory used in this study is the Family Systems Theory (Strong, Devault, & Cohen, 2005). This theory indicates that the family consists of several subsystems that perform specific functions. Family system theorists believe that the goal of a family is to maintain stability, which can make change difficult, but a well functioning family will grow and adapt to any changes. One main assumption of this theory is that each member of the system has an influence on the emotions and behaviors of each of the other members. As applied to this study, the theory would predict that Alcohol and Other Drug Abuse (AODA) counselors will

express that methamphetamine use of a primary caregiver disrupts the caregiver/child subsystem and the interactions between them. Based on this theory it is speculated that the use of the drug impairs the primary caregiver's ability to provide the functional needs of the child and that many children of users have been victims of neglect and/or abuse. The theory would also predict that family preservation is important in maintaining family stability.

Methods

Participants

Participants were surveyed at alcohol and other drug abuse (AODA) treatment facilities located in Northwestern Wisconsin. Participants included four males, 19 females, and one person who preferred not to be identified by gender. All participants were AODA counselors between 20 to 50 years of age. Regarding work status, of the female participants 12 worked in the field 1-10 years; six worked in the field 21-30 years; and one worked 31+ years in the field. Of the male participants, one worked 1-10 years in the field and three worked 11-20 years in the field. The last participant worked 11-20 years in the field.

Research Design

This study used a cross-sectional type of survey to collect data from a cross-section of the population at one point in time. Data was collected by a self-administered questionnaire which was low-cost, timely, and more efficient and convenient for the available population.

Data Collection Instrument

The data collection instrument was approved by the Institutional Review Board before data collection. The survey method was chosen to accommodate the resources and time available to complete the research and was designed by the researcher to address attitudes of AODA counselors on the effects of methamphetamine use on the children of users. The cover letter introduced the researcher, explained the purpose of the research, why the research is important, that participation was voluntary, and that no names would be used.

Participants were asked demographic information: Gender, age, and the number of years they have been working in the AODA field. The survey questions were all close-ended and were inspired by the Family Systems Theory, the literature, and information gained during interviews done with experts in the field. Questions regarding effects of

primary caregiver methamphetamine use on children included: media portrayal, caregiver's knowledge of the effects of the use, dangerousness of methamphetamine, should use be considered child abuse, if child abuse related to use should be reported, keeping family united or placed in protective service while user is receiving treatment, if children should be reunited with primary caregiver after receiving treatment, and if counselors believe that users can be rehabilitated.

A 5-point Likert Scale was used to measure the responses to the questions on the questionnaire. The Likert Scale is based on the idea that respondents can choose the intensity of their attitudes towards the statement or question being asked. The scale was categorical, (1) being Strongly Disagree to (5) being Strongly Agree. The survey instrument has face and content validity with questions being formulated through literature, theory, and experts in the field.

Procedure

At each of three AODA treatment facility sites in Northwestern Wisconsin, the researcher reviewed the cover letter with all participants before they filled out the survey, left to insure anonymity, and picked up completed surveys at a later time. The sampling design was purposive to target a specific population who would have the information being sought and would be willing to participate. Because of the limited access to participants the selection of respondents were not randomized.

Data Analysis Plan

Surveys were cleaned to insure complete data. Two of the surveys contained missing data so they were eliminated from the research to ensure validity. The coding process was done by identifying an acronym for each of the nine dependent variables. The Statistical Package for the Social Sciences (SPSS) computer package was used to analyze the data. The level of analysis in the study was the individual. Frequencies were used to analyze the results to give a description of the data, identif any missing data, and allow for comparisons among the responses to the questions. A reliability analysis, Chronbach's Alpha, was also conducted.

Results

All of the variables were subjected to frequency distribution analysis; there was no missing data.

Table 1

Frequencies

Variables	SD	D	U	A	SA	TOTAL
MEDIA	37.5%	29.2%	20.8%	8.3%	4.2%	100.0%
KNOW	45.8%	37.5%	12.5%	4.2%	0.0%	100.0%
DANGER	20.8%	8.3%	8.3%	16.7%	45.8%	100.0%
ABUSE	4.2%	0.0%	8.3%	37.5%	50.0%	100.0%
REPORT	4.2%	12.5%	16.7%	16.7%	50.0%	100.0%
UNITE	4.2%	12.5%	41.7%	20.8%	20.8%	100.0%
PROTECT	12.5%	8.3%	37.5%	20.8%	20.8%	100.0%
REUNITE	8.3%	0.0%	50.0%	29.2%	12.5%	100.0%
REHAB	4.2%	16.7%	29.2%	41.7%	8.3%	100.0%

Note. (MEDIA) The media portrays the effects of methamphetamine on children of users out of proportion. (KNOW) Most primary caregivers addicted to methamphetamine know the possible affects on their children. (DANGER) Primary caregivers who use methamphetamine are putting their children at greater danger than the use of other drugs and/or alcohol. (ABUSE) It should be considered child abuse when a primary caregiver exposes a child to methamphetamine by using. (REPORT) It is an AODA counselor's responsibility to report child abuse when it is know there are children in the home where methamphetamine is being used. (UNITE) It is usually in the best interest of children and primary caregivers to keep them united while the caregivers receive treatment in recovery facilities. (PROTECT) Most children of primary caregivers who are addicted to methamphetamine should be placed into protective services. (REUNITE) Most children who have been removed from addicted primary caregivers should be reunited after the caregiver receives treatment for their addiction. (REHAB) Most primary caregivers who are addicted to methamphetamine are able to become rehabilitated.

The nine variables (MEDIA, KNOW, DANGER, ABUSE, REPORT, UNITE, PROTECT, REUNITE, and REHAB) were subjected to a reliability analysis to assesses whether the survey variables

accurately measured the effects of methamphetamine in relation to the children of users. The Chronbach's Alpha reliability measure in this study was .236. This value indicates that the survey items have a low reliability index. If the (REUNITE) variable was to be deleted the Chronbach's Alpha value would raise to .422.

Discussion

Results support the hypothesis that the majority of Alcohol and Other Drug Abuse (AODA) counselors surveyed agree that primary caregiver methamphetamine use should be considered abuse and should be reported to authorities. In addition, the family should remain intact and families who had been separated should be reunited after treatment. The results point toward the attitude that methamphetamine use more dangerous to the children of users than the use of alcohol and/or other drugs. The outcome of the study also implies that media portrayals of the problem of methamphetamine use on children of users is not out of proportion, yet most of the caregivers have limited knowledge of the possible effects on their children. Media sources and other institutions should provide the public with more education to inform communities of the dangers of methamphetamine.

Regarding child placement in methamphetamine use cases, the majority of respondents felt that children and caregivers should remain united while the caregiver is receiving treatment and most of the children taken into protective services should be returned to their caregiver after receiving treatment. Contradicting previous results concerning unification of caregiver and children, the study also shows that attitudes only slightly favor that children in homes where methamphetamine is being used should be placed into protective services. Overall, a significant number of responses were marked as undecided. Participants commented on how they felt it was difficult to generalize to the population to answer the questions because each case is unique; this could possibly be an explanation of the amount of undecided results.

The research previously done implies that children in homes where methamphetamine is being used should be removed from that home. This information corresponds to the study's results that a slightly higher number of AODA counselors agree with children being placed in protective services. Since 71% of methamphetamine users are also parents it puts their children at risk of the problems that methamphetamine users experience (Brecht et al., 2004). It can be assumed that these behaviors can lead to child abuse and/or neglect but

there is a lack of any concrete evidence from this literature to support the findings that methamphetamine use by a caregiver can be considered child abuse.

The Family Systems Theory (Strong et al., 2005) used to predict the outcome of the study supports a portion of the results. Using the theory it was predicted that since methamphetamine use is considered to negatively affect the user then it would negatively affect other aspects of their life, and those who are caregivers to children could be putting their children at risk for neglect and/or abuse. This idea supports the findings that most AODA counselors think that methamphetamine use by a caregiver can be considered child abuse. The Family Systems Theory is also similar to the results that were found in that children and caregivers should be united and be reunited if separation was necessary.

Limitations

This study was limited by way of a small sample size and the lack of random sampling. Additionally, the respondents commented on the difficulty to gerneralize due to variations in each family's case. The subject itself is a limited, methamphetamine is still a fairly new subject and there is limited information about the drug. It could hinder how a participant would respond to questions if they lacked knowledge or only possess a small amount of knowledge on the subject.

Implications for Practitioners

What this research means to parents, teachers, AODA counselors, social workers, law enforcement and other relevant parties is that more information is needed to educate society on the dangers of methamphetamine and a need for more opportunities for them to get that information. This study suggests that most caregivers who use drugs do not know what their drug use is doing to their children; this should be a red flag to practitioners that more needs to be done to educate them. Recent legislation has touched on the issue of drug endangered children and child abuse laws, which suggest that laws should be passed allowing methamphetamine use by a caregiver to be considered child abuse and therefore those caregivers should be punished for violating those laws. Mandated reporting of child abuse laws for those who work with the children of users should also be enacted. Lastly, placement of drug endangered children is controversial, yet leans towards keeping the family together. This could result in the development of more family

preservation programs in the future to allow for the families to remain intact.

Implications for Future Research

The study was very general; in essence each of the survey statements could be a topic of research. For example, caregivers who use methamphetamine could be surveyed on their knowledge of the effects of those around them to find out where methamphetamine education needs improvement, or one could research what requirements are necessary for a caregiver to accomplish before they can be reunited with their children. Sampling a larger population and broadening the sampling area would give more diversity and strengthen the validity of the information discovered regarding the effects of methamphetamine.

Conclusion

Overall, results indicated that the majority of participants believe that primary caregiver methamphetamine use is considered child abuse and that such occurrences should be reported. Many of those surveyed agreed that children and caregivers should remain united or be reunited if children had previously been taken into protective services. Consequently, children who are affected by methamphetamine use by their primary caregivers are in need of help from the community and professionals. It would be beneficial to put together task forces, create more child welfare agencies, provide greater education on the topic, and pass laws to protect these children from harm. It is hoped that this research will create more awareness of the wide array of aspects of a child's life that are harmed when their primary caregivers use methamphetamine, and to promote future programs to help fight this drug problem and increase prevention measures.

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College Students' Attitudes toward LGBT Individuals

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Key Words: LGBT, homosexuality, discrimination, college attitudes

Abstract
Discrimination and oppression of the lesbian/gay/bisexual/transgender (LGBT) community is still very prevalent in society, as well as on college campuses. This study investigated attitudes toward LGBT individuals by surveying 50 university students in five different majors on campus. It was hypothesized that males, in general, would have a more heterosexist attitude toward this community. Results indicated that majors with a higher male population supported the hypothesis and were more heterosexist than other majors overall. The findings from this study can be used to enhance knowledge and societal attitudes in an effort to neutralize any discrimination based on sexual orientation.

Introduction

Despite a society that is moving forward in acceptance of differences, many young people still maintain uncomfortable and confused attitudes towards non-heterosexual lifestyles (Sharpe, 2002). These attitudes lead to discrimination and oppression of the lesbian/gay/ bisexual/ transgender (LGBT) community. According to Burn (2000), 77% of gay and lesbian college students in his study had experienced verbal insults due to their sexual orientation. Furthermore, 27% had experienced threats of physical violence, while 22% reported being chased or followed. Nearly all of the college students in this study had heard derogatory remarks on campus referring to LGBT individuals. The literature was examined regarding heterosexual's attitudes surrounding LGBT issues. Following the literature reviews, we surveyed the attitudes of UW-Stout undergraduate students in the following majors: Human Development and Family Studies (HDFS), Applied Science, Art, Engineering Technology, and Hospitality and Tourism (HT).

Literature Review

In researching attitudes towards homosexuality, it is important to keep in mind that there are limited studies available. This may be because the issue of homosexuality is a more contemporary topic in

today's society. Most of the studies found used the term homosexuality; however, we will be using homosexuality and LGBT interchangeably. The majority of the studies available seem to be correlational because they compare different populations and their attitudes towards homosexuality. Similarly, this study is attempting to show a relationship between college students' attitudes towards homosexual persons and which major that student is in. The articles that were reviewed gave some information on why people perceive individuals to be homosexual based on their characteristics. These four studies provided a basis for why more research is needed in this field. The research reviewed indicated that homosexuality is still something that is disapproved in society, even though it is more visible in the public domain (Wong, McCreary, Carpenter, Engle, & Korchynsky, 1999; Burn, 2000; Kim, D'Andrea, Sahu, & Gaughen, 1998; Herek, 1988).

Wong, McCreary, Carpenter, Engle, and Korchynsky (1999) examined why male and female college students thought some of their peers were of a sexual orientation other than heterosexual. This research suggests that a male will be looked down upon since he is lowering his social ranking by being more feminine, and that a female might not be "punished" for acting in an opposite gender role because the male role is considered superior.

In a study based on heterosexuals' use of the words "fag" or "queer," Burn (2000) found that harassment of gay students is common and that college students are frequently exposed to language that reminds them that LGBT individuals are seen as undesirable and abnormal by the dominant heterosexual society. Burn also found that anti-gay language is most common within the young male culture and is specific towards male homosexuality.

Kim, D'Andrea, Sahu, and Gaughen (1998) found that the issue of homosexuality in the past few decades has become a topic of greater discussion and is increasingly more public in the United States. This study focused on the knowledge individuals have about gay and lesbian persons in relationship to their attitudes toward the issue of homosexuality. Overall, having positive attitudes about homosexuals most likely implies that a person has more knowledge and understanding about the lifestyles of gay and lesbian persons. Furthermore, these positive attitudes lead to greater acceptance. A unique finding of this study indicated that students' knowledge and attitudes toward homosexuality changed significantly in relation to their chosen field of study. In particular, students in an education major expressed greater

knowledge and acceptance of LGBT individuals than students majoring in business.

In 1988, Herek tried to show a relationship between heterosexuals' attitudes toward lesbians and gay men and gender. Herek attempted to uncover whether heterosexual male attitudes were more positive or negative than heterosexual women by rating their homophobia, or personal and institutional prejudice against lesbians and gay men. According to this study, heterosexual individuals with negative attitudes are more likely to express traditional, restrictive attitudes about gender roles. One of the most consistent findings in this study revealed that heterosexual males manifest more anti-gay hostility on average than do heterosexual females. One explanation for men feeling more negatively toward homosexuality is the idea that American society has placed such an emphasis on the importance of heterosexuality being linked to masculinity.

While there was a very small study showing a relationship between education majors being less heterosexist towards LGBT people than business majors, the purpose of our study is to take it one step further by including more diverse majors. We are exploring the relationship between choice of major and heterosexist attitudes towards LGBT people. The central research question in this study is "What is the relationship of male and female college student's attitudes toward LGBT individuals compared across the curriculum in the following majors at the University of Wisconsin-Stout: Human Development and Family Studies (HDFS), Applied Science (AS), Art (ART), Engineering Technology (ET), and Hospitality and Tourism (HT)?" It is hypothesize that male-dominated majors will exhibit more heterosexist attitudes overall.

Theoretical Framework

The theory used in this study is the Feminist Theory (Strong et al., 2005). It was developed as a result of the feminist movement and it was used to study how each family was shaped by gender and gender roles. Historically, men were expected to display masculine attributes, while all women were expected to display femininity. This theory indicates that males and females have specific gender roles that they must conform to. While mostly gender related, this theory also extends to all oppressed groups based on age, class, ethnicity, race, disability, or sexual orientation. As applied to this study, the Feminist Theory would predict that the results would reflect that of society's assumptions towards males and females. This theory suggests that our sample's attitudes would

reflect heterosexual and traditional gender roles based on men possessing masculine traits and women exhibiting feminine traits. Also, this theory indicates that males are responsible for having established the gender roles in which all individuals, male and female, are expected to follow. This could imply that men, in general, have stronger feelings about staying within the gender role boundaries. Furthermore, because gender roles were socially constructed by men, we feel that males will probably have a more heterosexist attitude.

Methods

Participants

This study took place at Midwestern Wisconsin University. The participants consisted of 50 undergraduate students, 10 of each in the following majors: Human Development and Family Studies, Applied Science, Art, Engineering Technology, and Hospitality and Tourism. Of these fifty, 21 of the participants were male and 29 were female. There were 26 participants between the ages of 18-21, 16 between the ages of 22-25, and the remaining 8 participants were 25 years or older. There were 8 female and 2 male respondents in the Human Development and Family Studies major, 6 female and 4 male respondents in the Applied Science major, 8 female and 2 male respondents in the Art major, no female and 10 male respondents in the Engineering Technology major, and 7 female and 3 male respondents in the Hospitality and Tourism major. In terms of academic status, there were 30 seniors, 14 juniors, 6 sophomores, and no freshmen.

Research Design

The purpose of this study is to reveal current attitudes from the sample group and be able to use that data to broaden the view about a bigger population of similar students on campus. This study is best described as a cross-sectional study design in that it was used to capture knowledge, or attitudes, at one point in time. The study used a non-random probability sample design, because we needed to gather information from students in specific majors. Students were approached who potentially had the information needed and would be willing to share it, therefore purposive sampling was used. Finally, data was collected using self-administered questionnaires, as this seemed to be the most efficient method due to the fast pace of our research course, overall convenience, the low cost of using surveys and gathering data directly on campus, and the quick return of data.

Data Collection Instrument

In order to address the attitudes of students regarding LGBT individuals, a survey was created, which was approved by the Institutional Review Board for distribution. The survey developed included a cover letter, which explained the purpose of the study, as well as the research topic. It also contained information regarding confidentiality, contact information of the research team and the supervisor, instructions for completing the survey, estimated time of completion, a statement clarifying that participation is voluntary, and definitions of any terms the participant might not know.

The survey consisted of four demographic questions relating to major, age, gender, and academic status. Participants were then given seven closed-ended statements, which were the dependent variables, and were then asked to circle the answer that best describes their attitudes based on a 5-point Likert scale ranging from one (strongly disagree) to five (strongly agree). Questions were constructed from our understanding of the literature and what factors relate to attitudes regarding LGBT individuals. The questions covered information such as: familiarity with the term LGBT, knowing an LGBT individual, comfort level, spending social time with LGBT persons, LGBT information related to course content, LGBT rights in the US, and marriage rights. There was also space available for anyone to include thoughts or comments. To be sure the survey was clear and valid, it was piloted on five UW-Stout undergraduate students. Through the feedback received, it was concluded that the survey was ready for distribution.

The survey instrument has both face validity and content validity. Face validity refers to the instrument questions having a logical connection to the concept and research question. Because the questions and concepts addressed in the survey are literature-inspired, it was determined that they clearly connected to the larger problem of discrimination against LGBT individuals. Content validity refers to the instrument statements' coverage of the full range of concepts under the larger topic. The questions addressed a broad range of issue regarding LGBT discrimination as well.

Procedure

To collect the data for this study, we approached students on campus between March 8, 2006 and March 21, 2006. Students were asked what their major was; if the students fell into one of the majors needed, then they were asked if they would be willing to fill out one of the surveys.

For convenience purposes, we went into the buildings where the classes for these specific majors were normally held. Specifically, the targeted locations included the Home Economics building for HDFS and HT students, Jarvis Hall Science Wing for Applied Science students, Jarvis Hall Technology Wing for Engineering Technology students, and the Applied Arts building for the Art students. More so, the students in the Memorial Student Center and Micheels Hall were also asked. In order to maintain the most confidentiality possible, and in the hopes of more accurate surveys, participants were provided with an envelope along with the survey so they could seal it in the envelope when they were finished. They were then asked to place the envelope into a larger envelope. In order to get the most accurate information possible, we did not stand near the participants while they filled out the survey. Since the information in the surveys could be considered sensitive subject content, it was believed that standing near the participant might increase the socially acceptable responses instead of the true attitudes. None of the surveys were opened until all were collected. To ensure the sample number, we distributed more surveys than needed in case of missing data.

Data Analysis Plan

To enhance data validity, the research data was "cleaned" and checked for any missing data. The "cleaned" surveys were then "coded" using acronyms for each variable. The first questions on the survey were meant to describe characteristics of the participants such as: age, academic status, gender, and major. Of these four questions, the only independent variable was major *(MAJOR)*. The other three questions were meant only to describe the participants. Each attitude statement was also given an acronym name. Refer to the table below for each variable's name and meaning. To analyze the data, a data-analyzing computer program called Statistical Package for the Social Sciences (SPSS) was used. The individual was used as our level of analysis, and then frequencies, cross-tabulations, and a reliability analysis were conducted. The statistical reliability check used was Chronbach's Alpha.

Results

All variables were subjected to a frequency distribution analysis. The frequency distribution results revealed that there was no missing data. Using the cross-tabulation analysis, we were able to compare results

between the specific majors *(MAJOR,)* which are the independent variables, with the dependent variables.

Table 1

Cross tabulations

			FAMILIAR			
Category	**SD**	**D**	**U**	**A**	**SA**	**Total**
HDFS	0.0%	0.0%	0.0%	40.0%	60.0%	100.0%
Applied Science	10.0%	10.0%	0.0%	50.0%	30.0%	100.0%
Art	10.0%	0.0%	10.0%	20.0%	60.0%	100.0%
Engineering Technology	10.0%	0.0%	10.0%	60.0%	20.0%	100.0%
Hospitality & Tourism	10.0%	30.0%	10.0%	30.0%	20.0%	100.0%
			KNOW			
Category	**SD**	**D**	**U**	**A**	**SA**	**Total**
HDFS	0.0%	0.0%	10.0%	30.0%	60.0%	100.0%
Applied Science	0.0%	10.0%	10.0%	30.0%	50.0%	100.0%
Art	20.0%	0.0%	0.0%	20.0%	60.0%	100.0%
Engineering Technology	10.0%	0.0%	0.0%	70.0%	20.0%	100.0%
Hospitality & Tourism	10.0%	10.0%	0.0%	50.0%	30.0%	100.0%
			COMFORT			
Category	**SD**	**D**	**U**	**A**	**SA**	**Total**
HDFS	0.0%	10.0%	10.0%	30.0%	50.0%	100.0%
Applied Science	0.0%	0.0%	10.0%	40.0%	50.0%	100.0%
Art	0.0%	0.0%	10.0%	20.0%	70.0%	100.0%
Engineering Technology	0.0%	20.0%	30.0%	30.0%	20.0%	100.0%
Hospitality & Tourism	0.0%	0.0%	20.0%	40.0%	40.0%	100.0%
			SOCIAL			
Category	**SD**	**D**	**U**	**A**	**SA**	**Total**
HDFS	10.0%	10.0%	30.0%	20.0%	30.0%	100.0%
Applied Science	0.0%	30.0%	30.0%	20.0%	20.0%	100.0%
Art	0.0%	0.0%	20.0%	40.0%	40.0%	100.0%
Engineering Technology	40.0%	10.0%	20.0%	10.0%	20.0%	100.0%
Hospitality & Tourism	0.0%	20.0%	20.0%	40.0%	20.0%	100.0%
			CONTENT			
Category	**SD**	**D**	**U**	**A**	**SA**	**Total**
HDFS	0.0%	10.0%	30.0%	20.0%	40.0%	100.0%
Applied Science	20.0%	10.0%	70.0%	0.0%	0.0%	100.0%
Art	0.0%	10.0%	50.0%	30.0%	10.0%	100.0%
Engineering Technology	30.0%	30.0%	40.0%	0.0%	0.0%	100.0%
Hospitality & Tourism	10.0%	10.0%	40.0%	40.0%	0.0%	100.0%

			EQUAL			
Category	SD	D	U	A	SA	Total
HDFS	10.0%	0.0%	20.0%	0.0%	70.0%	100.0%
Applied Science	0.0%	10.0%	0.0%	30.0%	60.0%	100.0%
Art	0.0%	0.0%	0.0%	30.0%	70.0%	100.0%
Engineering Technology	10.0%	10.0%	20.0%	40.0%	20.0%	100.0%
Hospitality & Tourism	10.0%	0.0%	20.0%	40.0%	30.0%	100.0%
			MARRY			
Category	SD	D	U	A	SA	Total
HDFS	0.0%	20.0%	0.0%	30.0%	50.0%	100.0%
Applied Science	10.0%	10.0%	10.0%	40.0%	30.0%	100.0%
Art	0.0%	0.0%	10.0%	20.0%	70.0%	100.0%
Engineering Technology	40.0%	0.0%	30.0%	10.0%	20.0%	100.0%
Hospitality & Tourism	10.0%	0.0%	50.0%	30.0%	10.0%	100.0%

Note. (MAJOR)= HDFS, Applied Science, Art, Engineering Technology, Hospitality and Tourism; (FAMILIAR)=Familiarity with the term LGBT; (KNOW)= Knowing an LGBT individual; (COMFORT)= Being comfortable in the presence of an LGBT individual; (SOCIAL)= Spending social time with LGBT individuals; (CONTENT)= Importance of having LGBT content in all courses; (EQUAL)= LGBT individuals should have all the same rights as heterosexuals in the US; (MARRY)= LGBT individuals should be allowed to marry.

A reliability analysis was run to indicate if the seven variables *(FAMILIAR, KNOW, COMFORT, SOCIAL, CONTENT, EQUAL, MARRY)* were a reliable index to measure our concept (college students' attitudes toward LGBT individuals). Chronbach's Alpha is a measure of reliability. In this analysis, the reliability statistic was 0.830 out of a possible 1.0. This value indicates that the survey questions are a reliable measure of our central concept and were inspired from theory and literature.

Discussion

Overall, the results did support the hypothesis that majors with more males than females would have a more heterosexist attitude toward LGBT individuals. The current statistics on the male to female ratios in these majors are as follows: HDFS has 10% males and 90% females, AS has 49% males and 51% females, ART has 39% males and 61% females, ET has 96% males and 4% females, and H&T has 39% males and 61% females. Participants in the ET major had more "strongly disagree" or "disagree" answers to all variables than did any other major. According

to Herek (1988), heterosexual males manifest more anti-gay hostility on average than do heterosexual females. One example of this was demonstrated in the LGBT marriage *(MARRY)* question. Only 30% of ET participants agreed that LGBT individuals should have the right to marry, while the remaining majors had higher percentages in this area. Regarding the content *(CONTENT)* variable, no ET participants felt that LGBT content in their courses was needed. This could be interpreted as a gender issue, or whether they feel LGBT content is relevant to ET coursework. Moreover, ET participants had significantly lower levels of comfort *(COMFORT)* around LGBT individuals.

It has been suggested that there is a correlation between positive attitudes toward homosexuals and having knowledge about these individuals (Kim et al., 1998). Knowledge on this issue is best gained through experience, not necessarily a classroom setting. This idea is supported in our study because it found that all of the majors except for ET had a high comfort level *(COMFORT)* with LGBT individuals. This is related to the amount of social time *(SOCIAL)* spent with LGBT individuals. Students in the ET major spent the least amount of social time with homosexuals, whereas the other four majors (HDFS, AS, ART, HT) spent more time and had higher levels of comfort.

People in majors that work directly with people are generally more receptive and understanding of human diversity (Kim et al., 1998). Since the HDFS major focuses on working with diverse individuals, we predicted this study would show this. However, when analyzing the results, it was found that while HDFS had high levels of comfort *(COMFORT)* and equality *(EQUAL)*, AS and ART majors had even higher levels. Interestingly, when comparing equal rights *(EQUAL)* to the idea of LGBT marriage *(MARRY)*, all groups had higher percentages towards equal rights *(EQUAL)* and lower percentages toward marriage *(MARRY)*, except for HDFS. While 70% of HDFS agreed to equal rights *(EQUAL)*, 80% agreed to this issue of marriage *(MARRY)*. This was surprising because we felt that marriage was a part of the rights of US citizens, yet when marriage was set as a separate variable from equal rights, many people's responses changed.

Burn (2000) found that more positive beliefs and attitudes towards LGBT individuals are connected with knowing a lesbian or gay person. However, 90% of ET participants claimed they knew a homosexual individual *(KNOW)*, yet their responses to the remaining variables suggests they have the most negative attitudes within our study. This raises the question of whether how well you know an LGBT individual

matters in how you feel about them.

As stated earlier, Feminist Theory (Strong et al., 2005) asserts that men are responsible for socially constructing gender roles. This theory indicates that males and females have specific gender roles they must conform to. Because of many historical factors, men have stronger feelings about staying within their gender role boundaries. According to this theory, it was predicted that men would have more heterosexist attitudes. The results indicated this to be true.

Limitations

The most significant limitation of this study was the sample size. Due to the small sample size, we are unable to generalize the findings to other populations. Another limitation was the use of our non-random sampling. This also restrained us from generalizing beyond college students within the majors we surveyed. An additional limitation could be the sensitive nature of our topic, which may have caused some respondents to answer in a socially acceptable manner.

Implications for Practitioners

It is important for all family practitioners to recognize their own biases, prejudices, and opinions and not allow these to interfere with their work. The findings of our research suggest that more education is needed on this topic. Since teachers are the primary educators of children these days, we feel it is imperative for teachers to be more educated on issues regarding LGBT people. This education could be provided in many forms, such as professional development workshops and/or conferences and on the job training could help to educate family practitioner and other educators. When educators have a better understanding of LGBT issues, they are better able to teach and relay information needed to help students achieve acceptance. Acceptance is learned at an early age.

Implications for Future Research

It seems that most of the research studies investigated conducted their studies with college students, much like this study. We would like to suggest a research study be conducted with people that have never attended a secondary school. A study such as this would determine if education plays a role in attitudes, or if gender really is the main factor.

Conclusion

As a result of this study, it is our hope that attitudes towards LGBT

people are better understood. Overall, we feel this study was important and valuable in addressing this societal issue. The results from this study should be used for enhancing knowledge and attitudes of society in an effort to neutralize any discrimination based on sexual orientation. We would like to see the social stigma attached to homosexuality disappear, and feel education is the best way to make that happen. Gender seems to be the constant within the research, and this is important to know when attempting to educate and make changes in society.

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Female Students' Attitudes on Re-entering Abusive Relationships

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Key Words: Female college students, abuse, re-entering, optimistic bias.

Abstract
Women re-entering abusive relationships is an increasingly important issue. This study investigated female college students' attitudes on why women re-enter abusive relationships in hopes to gain a further understanding of possible reasons. It was hypothesized that the given variables: Lack of education, financial independence, abuse history, unrealistic optimism, remorse factor, and emotional attachment, would play a factor in whether or not one would return. Findings supported the hypothesis that the variables utilized were felt to be factors in women re-enter, except for optimistic bias. Implications for practitioners and for future researchers are that awareness needs to be focused more on this optimistic bias, encouraging women more directly by teaching them self awareness.

Introduction

According to Hilbert and Hilbert (1984) and Strube (1998), an estimated half of women who have been involved in an abusive relationship will at some point return to the batterer (as cited in Martin, Berenson, Griffing, Sage, Madry, Bingham, & Primm, 2000). Because of the physical and emotional risks involved in such relationships, it is important to study various factors to gain further insight into the reasons why women return to these abusive relationships. For the purpose of this study, abuse refers to misusing power and or injuring oneself or another (Merriam Webster's Collegiate Dictionary, 2000). A piece to the puzzle does not fit. To escape only to re-enter leaves reasons to believe hidden variables reside within the given relationship and or within the abused victim. What are these variables and if identified, could the number of those who re-enter abusive relationships decrease? Understanding reasons for returning could have a significant impact on breaking the cycle abused women often fall into. Variables that will be investigated include Optimistic Bias, underestimating the reality of risk (Martin et al., 2000); the Remorse Factor, returning out of guilt (Griffing, Ragin, Sage, Madry, Bingham, & Primm, 2002); and Emotional Attachment,

which implies an affectionate regard for another person through personal ties (Merriam Webster's Collegiate Dictionary, 2000). The literature regarding women who encountered relational situations where the choice of leaving and or staying had been provoked through abuse was examine. To gain a better understanding of possible reasons as to why women chose to stay or to leave, we surveyed the attitudes of female college students at a small Midwestern university.

Literature Review

In researching reasons as to why women enter and or re-enter abusive relationships, it is important to evaluate past studies. In examining this topic, there appears to be a gap from 1987 to 2000. There are many studies on women who stay, but not many studies have been done regarding women who leave and return. Society often depicts women who re-enter an abusive relationship as those who have a low self-esteem or low self-confidence. This is not always the case. Many hidden variables lie within the reasons women chose to or not to reunite with their batterer (Schutte, Malouff, & Doyle, 1987; Martin et al., 2000; Griffing et al., 2002; Griffing et al., 2005).

A study conducted by Schutte et al. (1987) researched 117 women in an abusive shelter in Colorado. This study investigated the history of women and whether or not their history had an impact on the choice of leaving or staying. Did pre-victimization affect women's choices? Surprisingly, the results showed women who were physically or sexually abused as children were less likely to return to an abusive relationship. A history of victimization did carry some leverage in depicting whether or not a woman returned to her abuser, however, this process was seen to have taken place over a long period of time creating what appears to be a cycle of leaving, entering into a shelter, and returning to the batterer. Education reflected a large advantage for women seeking an outlet from the abuse. The study showed that women who were educated were less likely to re-enter into the relationship. This supports findings that women in careers have fewer financial ties to the batterer, resulting in a less stressful situation.

Martin et al. (2000) conducted a study to try to understand risk assessment and decision-certainty within 70 female domestic violence victims. The researchers discovered that abused women who reflected high levels of certainty also showed greater levels of what was called optimistic bias. Simplistically, women who were sure they would not go back were at a higher risk of returning. Women were seen as

underestimating the reality of their risk, indicating there was a need for increased self awareness. This underestimating of obstacles played a factor in the decision process of leaving. However, there was some relation between prior separations and ultimately remaining outside of the relationship. Possibly, this cycle of leaving only to return allows a woman to slowly over time regain self sufficiency helping to sever the ties permanently.

Griffing et al. (2002) examined external and internal stress factors that could impact a woman's choice of leaving and or re-entering abusive relationships. The study took place at an urban retreat consisting of 90 African American and Latina young female residents. Reasons for returning in the past and the thought of doing so again were examined. They found that emotional attachment and the remorse factor for the batterer caused an increased probability of returning. Women may feel as if the abuser has been punished enough with her leaving and return out of guilt. Again this reflected the risk factor that many women were not aware of their own optimistic biases. Financial needs were also a top for reason for why women returned, which was often combined with emotional guilt creating a situation tying both internal and external aspects together in the decision-making process.

Griffing et al. (2005) also studied the impact of women's past history. study dealt with the increased risk that women who have previously been victimized have in entering or returning to abusive relationships. Again, African American and Latina women were studied. Sixty-six percent had separated from and returned at least one time. The study suggests that women who have been a victim in earlier years may have a more difficult time separating from an abusive relationship due to vulnerability aspects and self-esteem. These women are at a greater risk of returning than those who have not been abused as a child. However, this cycle could possibly be a necessary step in eventually separating completely from the batterer.

Among the literature reviewed, there were three major factors questioned: Does past experience play a part in the cycle of abuse? Are women caught in self biasness and therefore not aware of the eluding possibility that they are at risk for returning? And, how much impact does guilt play into women putting the batterer above there own self worth? From the studies presented, many insightful discoveries were made in understanding possible reasons this cycle of entering, leaving and re-entering take place. However, in order to subdue this violence, one must anticipate those at risk before the cycle begins. College students

were researched to try to help fill a gap in research in discovering whether or not knowledge and awareness removes the risk of women re-entering into abusive relationships.

Theoretical Framework

The theory used in this study is the Social Learning Theory (Strong, Devault, & Cohen, 2005). It was developed by Julian Rotter and Albert Bandura, among other psychologists who highlighted the role of cognition in learning. This theory emphasizes the importance modeling has on children and how behavior learned through this process can affect one's interactions. These interactions are in relationship to culture, society, family, and the natural inner qualities of a given entity. This theory suggests that influence from parents holds much weight in establishing self expectations.

As applied to our study, this theory predicts that a given individual's past experiences (learned behavior through modeling) in culture, society, family, and the natural characteristics an individual holds, will determine the choice(s) in entering and or re-entering into abusive relationships.

Purpose Statement

The purpose of this study is to examine the research question: "What are the attitudes of female college students regarding reasons as to why women re-enter into abusive relationships." It is hypothesized that the given variables will determine the reasons why women re-enter into an abusive relationships: Education, financial situation, past abuse history, optimistic bias (un-realistic optimism), remorse factor, and emotional attachment (Strong et al., 2005).

Methods

Participants

The site of this study was at a Midwestern university. Participants were 51 female students and one person who declined a gender label. There were five participants within the freshman category, 13 sophomores, 12 juniors, 19 seniors, and three graduate students. Of these 52 students, 32 ranged in age from 18-21, 15 were 22-25, and 5 were over 25.

Research Design

The survey design type used is best described as a cross-sectional study design in that we captured attitudes from a cross section of the

population at one point in time. The form of data collection was self-administered questionnaires. This method was most fitting in that it was the most efficient way to gather the data directly on campus since the data collection needed to be fast paced, convenient, low cost, and have a quick return due to the time constraints of the class. The population was the university student population; our sample was female students randomly selected through the quota sampling design hence acquiring many different backgrounds, from majors to age. The ethical protection of human subjects was provided by completing the Human Subjects Institutional Review Board (IRB) training; our study was approved by the IRB.

Data Collection Instrument

In order to address the attitudes of students regarding reasons as to why women re-enter into abusive relationships, a survey was designed. The survey included a cover letter with an implied consent which included a description of the study for the participants to keep. It also included definitions of any terms not commonly known, along with risks and benefits, time commitment, confidentiality, voluntary participation, and finally, contact information of the research team, the supervisor as well as the instructions needed for completing the survey. The survey consisted of three demographic questions relating to gender, academic status and age. Participants were then given seven closed-ended statements based on a 5-point Likert scale which measured the intensity of the respondents' attitudes ranging from one (strongly disagree) to five (strongly agree). Questions were developed using the literature and theory regarding what factors relate to attitudes regarding abused women.

The survey instrument has both face validity and content validity. Because the questions and concepts addressed in the survey are literature-inspired, it was determined that they clearly connected to the larger problem of abused women re-entering into abusive relationships. Instrument statements' cover broad range of issues regarding possible reasons abused women re-enter abusive relationships. To increase validity, the survey was piloted on one undergraduate female student. Feedback indicated that the survey was clear and ready for distribution.

Procedure

To collect the data for this study, the researchers approached students on campus between October 30, 2006 and November 1, 2006. Following

the random sample design, researchers went into the Student Center and asked one out of every three women as they passed by if they would be willing to fill out the survey. Participants were read the implied consent and notified that it was theirs to review further if desired. To maintain the most confidentiality possible, participants were asked to take the survey at a table other than the researcher's and encouraged to complete it at their own pace. They were then told to place the finished survey into a closed box which was placed out of sight. We over sampled by five respondents to ensure the target sample number was met in case of missing data. As surveys were collected they were kept in a locked box at one of the researcher's homes until data analysis.

Data Analysis Plan

The data was first "cleaned" and checked for any missing data, assuring that the surveys were filled out in their entirety. The "cleaned" surveys were then "coded" using acronyms for each variable. Demographic variables: gender, academic status, and age were the first three questions on the survey. Each survey statement was a dependent variable and given an acronym name: To determine if lack of education was a variable we used the acronym (EDU), to determine if lack of financial independence was a variable we use (FIN), to Abuse history was a variable we used (HIS), if unrealistic optimism (optimistic bias) we used (UOP), if remorse played a factor we used (REM), if having children involved was a variable we used (CHD), and finally if emotional attachment was a variable we used (EMA). The data-analyzing computer program called *Statistical Package for the Social Sciences* (*SPSS*) was used to analyze the data. Given our research topic we used descriptive statistics consisting of frequencies and conducted a reliability analysis, Cronbach's Alpha.

Results

The results indicated that there was no missing data. The Cronbach's Alpha measure of reliability in our analysis was 0.211.

Table 1

Frequencies

Variable	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree	Total
(EDU)	11.0%	23.0%	21.0%	35.0%	10.0%	100.0%
(FIN)	2.0%	12.0%	13.0%	52.0%	21.0%	100.0%
(HIS)	2.0%	10.0%	23.0%	38.0%	27.0%	100.0%
(UOP)	15.0%	27.0%	37.0%	19.0%	2.0%	100.0%
(REM)	0.0%	2.0%	10.0%	50.0%	38.0%	100.0%
(CHD)	0.0%	14.0%	15.0%	46.0%	25.0%	100.0%
(EMA)	0.0%	19.0%	12.0%	42.0%	27.0%	100.0%

Note. (EDU)=Women who lack education is a factor in women re-entering an abusive relationship; (FIN)=Women who lack financial independence is a factor in re-entering an abusive relationship; (HIS)=Women with an abusive past are a factor in re-entering into an abusive relationship; (UOP)= Women who overlook their risk of abuse have a greater possibility of re-entering into an abusive relationship; (REM)= Women who feel guilty for leaving are a higher risk in re-entering an abusive relationship; (CHD)= Children impact women to re-enter an abusive relationship for reasons of not wanting to take them away from their father; (EMA)= Romantic feelings impact women to re-enter abusive relationships.

Discussion

Findings supported our hypothesis. To begin, education was seen as somewhat of an advantage for women wanting to transition out of an abusive situation. Women with more education have a greater extent of career choices leaving them with fewer ties to the batterer (Schutte et al., 1987). Forty-five percent of participants agreed that lack of education would increase the chances of one re-entering making this the highest percentage indicated in the data.

According to Griffing et al. (2002), a primary reason why women tend to return to an abuser is because of financial issues. If a woman's finances are stable, she is less likely to be at a high risk for re-entering into an abusive environment (Martin et al., 2000). Based on the research

this tends to be viewed as a high indicator in women who re-enterer, with 73% agreeing. Lack of resources and support in this given area creates a burden often vastly difficult for an individual to carry and hence making the option of staying seem more simplistic and less stressful.

The abuse history variable stated that previous victimization carries leverage in determining whether or not a woman will reunite with the abuser (Schutte et al., 1987). According to Griffing et al. (2005), women who had been a victim earlier in life were at a higher risk of returning to an abusive relationship due to vulnerability aspects and lack of self-esteem. Looking at the results, 65% of participants were in agreement.

An interesting variable was that of the remorse factor. This variable intertwines itself with that of past history and emotional attachment. From the results presented by Griffing et al. (2002), women who previously returned to a batterer reflected a higher level of emotional attachment and were more likely to continue the cycle of re-entering over a woman who was separating herself from a situation for the first time. This remorse factor would place a more direct level of guilt among the women after hearing promises from the batterer that he will seek counseling and obtain help hence heightening the risk of returning by placing the women into a mental state of 'believing' change will occur. The data collected showed that this variable had the highest level of agreement, with 88%.

This leads to the only variable in which the majority of participants disagreed with, which was the proposed idea of optimistic bias. Optimistic bias, according to Griffing et al. (2002) is when an individual does not perceive his/her risk accurately. According to this article, a relationship between an abuse history and emotional attachment was clearly portrayed in women who returned. Women who had previously left and returned were more inclined to admit that emotional attachment would affect their decision into re-entering. However, those who left for the first time were less willing to state they would return. In our study, female college students overall disagreed with optimistic bias, with 42% of the sample in disagreement with the statement. The majority responded that this issue would have little to no effect on individuals. However, because this 'idea' is new, many people may not be aware of this way of thinking.

Limitations

The sample size may limit the generalizability of results. Also, because of the location to which participants were selected, a lack of diversity is noted.

Implications for Practitioners

Findings indicated that much awareness dwells in the mindset of mid-western, female college students. The need to inform females of the tendency to underestimate or not identify self-risk is important in that it could an opportunity of decreasing victimization. This could be done by first educating both females and males at the high school level through means of health classes promoting self risk awareness. It could be done by educating teachers and those in leadership positions working with youth. Also, at the college level, an initiative could be made to hall directors and resident advisors working with freshman students incorporating once again the idea of self risk helping individuals acquire the skills to assess their risk accurately.

Implications for Future Research

The next step of research recommended would be to enhance the sample size by reaching out to more than one university; incorporating a more diverse sample would allow for more generalization of female college students' attitudes in the Midwest. If this study were to be duplicated we would recommend possibly re-wording or providing an explanation of the optimistic bias variable *(UOP)* which is women who overlook their risk of abuse have a greater possibility of re-entering into an abusive relationship. We feel this variable is of importance in this field of study and should not be overlooked. According to our reliability analysis the Cronbach's Alpha would increase from 0.211 to 0.468 if the variable *(UOP)* was eliminated. However, we think possible reasons for this would be a lack of knowledge and understanding regarding the concept of optimistic bias.

Conclusion

As a result of this study, we have found that a majority of female college students hold adequate knowledge of possible reasons why women re-enter abusive relationships. However, it appeared that a lack of understanding one's risk could hinder a woman's perception in deciding whether or not to remain in the company of abuse. As a result, it is hoped that more emphasis be put on educating women on gaining

self awareness not only for the purpose of physically, and emotionally removing themselves from the situation, but in the possibility of helping women gain the tools and resources needed in stopping the cycle (re-entering) of abuse. What one learns can in fact be unlearned (Strong et al., 2005). This cycle can be reversed. For example, a learned behavior may lead to a practiced habit, but this habitual act can possibly be undone through the process of gaining self awareness. Believing in oneself is where this power of change resides. True learning is to realize the possibilities in unlearning.

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Taking Action to Protect UW-Stout's Last Remaining Wetland

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Key words: Wetland delineation, wetland indicators, hydrophytic vegetation, hydric soils, wetland hydrology

Abstract
Wetlands provide many essential ecosystem functions, such as flood control, wildlife habitat, and groundwater recharge. Although wetlands in Wisconsin are protected, not all wetlands are recognized. According to the Wisconsin Public Land Survey records of 1849, a tamarack bog wetland once existed where the University of Wisconsin-Stout is currently located. A 1.01 acre remnant of that original wetland still exists, located within the outdoor classroom area on the south end of the UW-Stout campus, east of the UW-Stout baseball field and north of 18th Street. In order to protect and properly manage this wetland, the wetland boundaries were identified using the protocols established by the U.S. Army Corps of Engineers. Hydrophytic vegetation, hydric soils, and wetland hydrology were evaluated to determine the boundary of the UW-Stout wetland. Establishing the wetland boundary is a critical step in protecting and managing this unique remnant wetland. Now that the wetland area has been defined, UW-Stout Biology faculty will have the ability to pursue grant opportunities to continue the wetland restoration efforts.

Introduction

During the past 150 years, over 50% of the original wetlands in Wisconsin have been destroyed due to human settlement and development (Eggers & Reed, 1997). Wetlands are critical ecosystems; they store water to prevent flooding, protect water quality, and provide essential habitat for wildlife. According to the Wisconsin Public Land Survey records of 1849, a tamarack bog wetland once existed where the University of Wisconsin-Stout is currently located (Wisconsin Public Land Survey Records, n.d.). A 1.01 acre remnant of that original wetland still exists, located within the outdoor classroom area on the south end of the UW-Stout campus, east of the UW-Stout baseball field and north of 18th Street (Figure 1).

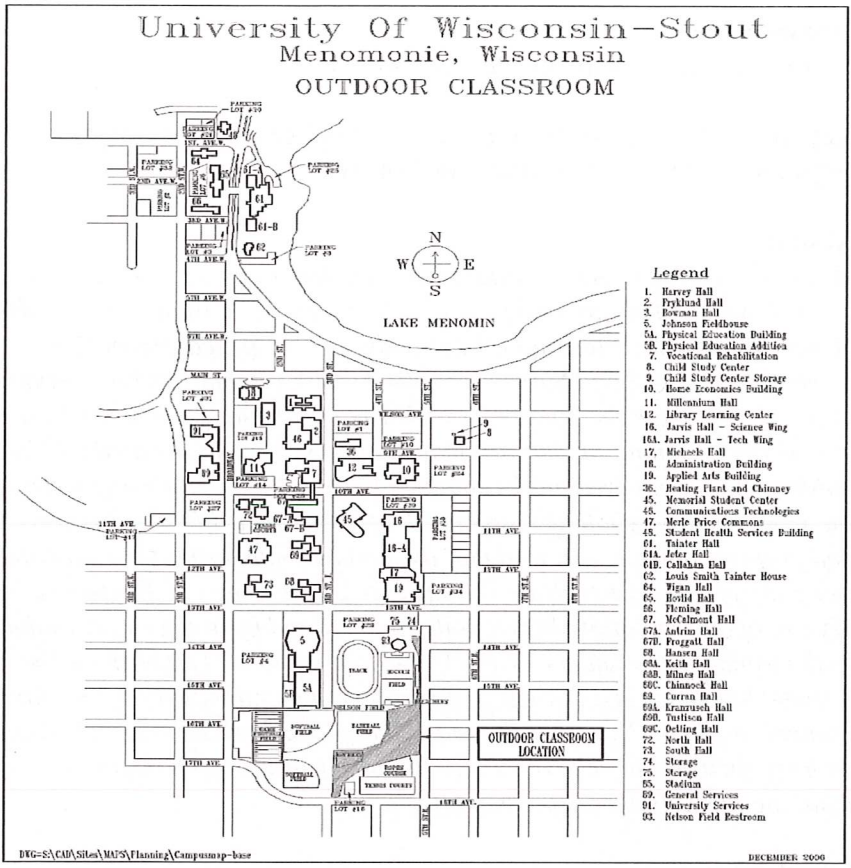

Figure 1. The location of the wetland on the UW-Stout campus (provided by the Physical Plant Department, UW-Stout, 2006).

According to the Dunn County Register of Deeds, the wetland area was purchased from private owners between 1968 and 1967 in order to expand the Nelson Athletic Field (Dunn Co, n.d.). The area was significantly impacted when a baseball diamond was developed in the early 1970s (Sparger, 1970):

The improvements will include raising the field one and one half to two feet because of poor drainage and swampy land. Filler for this area is being taken from an area south of the field where some old homes have been torn down…..Softball and baseball diamonds and an archery range will be constructed south of the field. (p. 8)

UW-Stout Biology Department faculty and students are currently working with the UW-Stout Grounds Department on management plans to protect native species and control unwanted invasive plant species. A critical component of this wetland management plan is wetland delineation, a scientific process that defines the boundaries of a particular wetland for protection and management. During the spring 2006 semester, Maxine Pettis, an Applied Science student, received funding from the UW-Stout Student Research Fund to attend a wetland delineation training workshop. The actual wetland boundary determination was conducted from September to October, 2006.

Methods

The UW-Stout Wetland is located in the southeast part of Section 35, Township 28N, Range 13W; Dunn County, Wisconsin. The wetland was delineated using the procedure described in the *U.S. Army Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory, 1987) and in the *Basic Guide to Wisconsin Wetlands and Their Boundaries* (Wisconsin Coastal Management Program, 1995). Resources used to initially identify wetland features included the *Natural Cooperative Web Soil Survey* (n.d.) and the *Hydric Soils List for Dunn County* (1995).

In order to make a precise determination of the wetland boundary, a 605 foot baseline was established parallel to the lowest end of the wetland (Figure 2); five different transect lines (200ft apart) were established perpendicular to the baseline. For each transect line, two sample points were used, one in the wetland area and one in the upland area; soil probing helped determine the approximate boundary. At each sample point, the presence or absence of hydrophytic vegetation, hydric soils, and wetland hydrology was determined using the protocol established by the U.S. Army Corps of Engineers (Environmental Laboratory, 1987). The wetland boundary was set where indicators for any one of the three parameters no longer existed. Transect two (T2) only had a wetland sample point because of the thick vegetation that blocked progress to the upland area (Figure 3). Transect three only had an upland sample point (T3 upland) because of the steep slope that occurs there; only one of the three wetland indicators was present (hydrophytic vegetation).

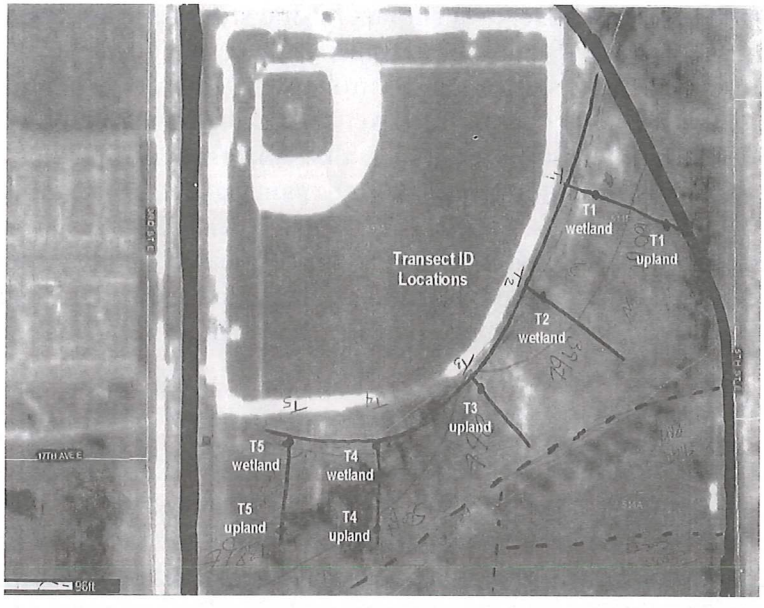

Figure 2. Transect ID locations within the UW-Stout wetland area (The Natural Cooperative Web Soil Survey, n.d.).

Vegetation

Vegetation sampling resulted in the assignment of an indicator status for the dominant plants in each strata of the flora. The flora strata included: herb- anything less than 3 feet tall; shrub- woody vegetation less than 20 feet tall; sapling- woody vegetation taller than 20 feet and less than 5 inches in diameter at breast height (DBH); tree- woody vegetation taller than 20 feet and greater than 5 inches DBH; and wood vine- woody climbing plants less than 3 feet tall (Environmental Laboratory, 1987).

At each sample point within each transect, the percent cover for each plant species in the plot area was visually estimated and recorded; a 1.0-m by 1.0-m square quadrant was used to determine the percent cover for herbs; and a 9-m (30ft) radius was used to determine percent cover for shrubs, saplings, trees and woody vines. After estimating the percent aerial cover for each species, the 50/20 rule was applied to determine dominance. Under the 50/20 rule, any plant species that equals or exceeds 20% of the total percent coverage of the plot is a dominant plant. In addition, the cumulative total of all dominant plants must be equal to or greater than 50% of the coverage of the plot.

The *National List of Plant Species that Occur in Wetlands* (Reed, 1988) was used to determine the indicator status of each plant. The indicator categories are as follows:

Obligate Wetland (OBL) - Occur in wetlands >99%
Facultative Wetland (FACW) - Occur in wetlands 67% - 99%
Facultative (FAC) - Occur in wetlands 34% - 66%
Facultative Upland (FACU) - Occur in wetlands 1% - 33%
Obligate Upland (UPL) - Occur in Wetlands <1%

Plants that are OBL, FACW or FAC are positive wetland indicators. If greater than 50% of the dominant plants in all vegetation strata are OBL, FACW and/or FAC, then the hydrophytic vegetation criteria for a wetland is satisfied.

Soils

Hydric soils were identified in the wetland area by digging a pit 1 foot in diameter and 18 inches deep and removing a slice of the intact soil profile from the side of the hole. The profile was then examined for evidence of long-term saturation. Soils that are waterlogged for long periods become depleted in oxygen. The lack of oxygen restricts normal breakdown of dead plant debris, causing partly decomposed organic matter to accumulate on the soil surface; it also causes chemical changes in the soil, which can affect soil color and odor (Environmental Laboratory, 1987). At each sample location, soil matrix color, soil texture, presence of mottling or gleying, and presence of odor were recorded. Soil hue, value and chroma were determined using a Munsell® Soil Color chart.

Hydrology

Wetland hydrology refers to the presence of surface water or waterlogged soils for a sufficient period of time so that it influences the kinds of plants and soils that occur in an area (Wisconsin Coastal Management Program, 1995). Wetland delineators use primary and secondary hydrologic indicators that can be observed during a field inspection. Primary indicators are surface features resulting from flooding, ponding, and direct observation of groundwater tables. Secondary indicators are characters that result from prolonged subsurface saturation.

Test pits were established at the different sample points in order to determine the presence or absence of wetland hydrology. Primary indicators used to determine whether wetland hydrology existed were

visual observation of inundation or saturation, watermarks, drift lines, sediment deposits, and drainage patterns. Secondary indicators for hydrology that were used included oxidized root channels, water stained leaves, and the FAC Neutral test. For the FAC Neutral test, the number of dominant plant species that were FACW and OBL (wet) were compared with the number of dominants that were FACU and APL (dry). The FAC plants (neutral) were excluded. If there were more wet dominants than dry dominants, then the plant community reflected the presence of wetland hydrology (Environmental Laboratory, 1987).

Results

The wetland is located at the base of a hill where it receives considerable surface runoff and groundwater flow (Figure 3). According to Lynn Peterson, UW-Stout Grounds Supervisor, at one time a small pond existed in the southeast section of this wetland. This pond was most likely filled in when the property was purchased and developed by UW-Stout in the early 1970s. There are currently no streams or other waterbodies that adjoin this wetland area. Under natural conditions, water pools at the surface when the water table is high (i.e. spring melt). However, when the new baseball diamond was established in 1971, five storm drains were installed in the wetland area (Figure 3) in order drain off excess water from the adjacent athletic fields. These drains have greatly affected the hydrology of this wetland area. Instead of remaining within the wetland, pooled water enters the drains, flows through two underground storm pipe systems (one to the south and one to the west of the baseball field), and continues flowing through the City of Menomonie storm drain system until it finally discharges into Galloway Creek, a nearby urban stream.

Vegetation

The average annual total precipitation for this area is about 30.55 inches (National Water and Climate Center, n.d.). Of this, about 65% (19.89 inches) usually falls from May through September. The growing season for most plants falls within this period. The wetland delineation was conducted at the end of September and beginning of October; therefore, the field investigator may have missed some of the plants that grow earlier in the season.

Eight sample points were evaluated at the UW-Stout wetland (Figure 3). The T2 wetland site and T3 upland sites rated 86% and 80%, respectively, and the T1, T4, and T5 wetland sample points

each rated 66% dominant facultative or wetter plant species. Wetland vegetation consisted of goldenrod (*Solidago* spp.), boneset (*Eupatorium perfoliatum*), silver banner grass (*Miscanthus sacchariflorus*) and cattail (Typha x glauca). Wetland trees included silver maple (*Acer saccharinum*), river birch (*Betula nigra* L.), American elm (*Ulmus americana*), black willows (*Salix nigra*) and box elder (*Acer negundo*). Upland vegetation consisted of American red raspberry (*Rubus strigosus*), black locust (*Robinia pseudoacacia*), and common buckthorn (*Rhamnus cathartica*). Upland trees included bur oak (*Quercus macroparpa*) and some white pine (*Pinus strobus*) (Pettis & James, 2006).

Many years ago, purple loosestrife (*Lythrum salicaria*) and silver banner grass (*Miscanthus sacchariflorus*) were intentionally planted in this wetland under the misguided belief that they would beautify the area. Lynn Peterson, UW-Stout grounds supervisor, and Krista James, Biology Dept faculty, have been working with the Wisconsin DNR to raise and release the purple loosestrife biological control (Galerucella beetles) to this and other wetlands in Dunn County. Other restoration efforts include buckthorn (*Rhamnus cathartica*) eradication and the planting of native tamarack (*Larix laricina*) seedlings.

Soils

Two major soil series are found within the UW-Stout wetland, Newson and Markey; both are listed as hydric soils for Dunn County (Natural Resource Conservation Service, n.d.). The Newson series consists of very deep and very poorly drained soils formed in sandy outwash, sandy alluvium, or sandy lacustrine deposits on outwash plains, lake terraces, stream terraces, and valley trains. The Markey series consists of very deep, very poorly drained organic soils formed in herbaceous organic material 16 to 51 inches thick overlying sandy deposits in depressions on outwash plains, lake plains, flood plains, river terraces valley trains and moraines. Of the eight sample points evaluated at the UW-Stout wetland (Figure 2), hydric soils were determined to be present at 6 of the locations (T1 wetland, T2 wetland, T4 wetland, T4 upland, T5 wetland, and T5 upland).

Hydrology

The current hydrologic circumstances at the wetland are the result of the area's geomorphology, climate, and human-induced changes that have occurred over many decades. These changes include baseball field and sidewalk development, vegetation management, ditch construction,

and the installation of storm drains.

During the summer of 2006, the City of Menomonie experienced an extended drought. Total accumulated rainfall from May through September was only 15.56 inches, with 43% (6.73 inches) occurring in August (National Water and Climate Center, n.d.). Since the wetland delineation field work was conducted in late September and early October, indicators such as inundation, water stained leaves, and water marks on trees were absent. Of the eight sample points evaluated at the UW-Stout wetland (Figure 2), wetland hydrology was determined to be present at four of the locations (T1, T2, T4, and T5 wetland), with the depth of standing water in the pit ranging from 7.5 to 15 inches. Indicators of wetland hydrology observed included soil saturation in the upper 12 inches (primary indicator), and oxidized root channels in the upper 12 inches and positive FAC- neutral tests (secondary indicators) (Pettis & James, 2006).

Discussion and Conclusion

The Wisconsin Statute Section 23.32 (1) states that "wetland means an area where water is at, near or above the land surface long enough to be capable of supporting aquatic or hydrophytic vegetation and which has soils indicative of wet conditions" (Wisconsin State Legislature, 2006). Three parameters were used to delineate the UW-Stout wetland boundary. These parameters were vegetation, soils, and hydrology. For a sample location to be classified as wetland, it has to have at least one positive indicator for each of hyrophytic vegetation, hydric soils, and wetland hydrology. The wetland boundary was set where indicators for any one of the three parameters no longer existed (Figure 3). In the near future, the wetland area in the northern section of the outdoor classroom (northern side of the sidewalk) will also be delineated. A different Applied Science student will be recruited to complete this task.

A map outlining the wetland boundary was a critical step in restoring and managing this unique remnant wetland on the UW-Stout campus. Now that the area has been defined, UW-Stout Biology faculty will pursue grant opportunities to continue the wetland restoration efforts. Students participating in biology courses for many years to come will have the opportunity to be involved in all management aspects, including the eradication of invasive species, planting and seeding of native species, and basic maintenance. As Stout alumni, they will return to the University and, seeing improvements in the health of this wetland, will know that their efforts contributed to this progress.

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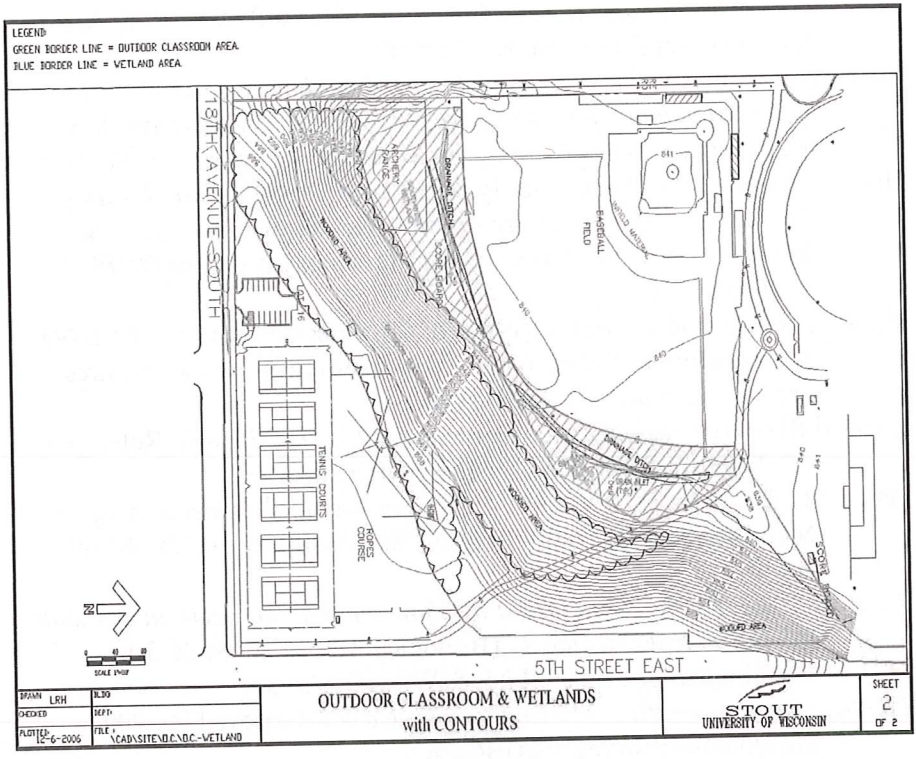

Figure 3. Final wetland delineation map for the UW-Stout wetland (provided by the Physical Plant Department, UW-Stout, 2006).

(Wisconsin DNR), and Deb Konkel (Wisconsin DNR) for providing assistance in identifying plant species; and Tim Meyer, USDA Soil Scientist for assisting in the classification of soils within the UW-Stout wetland.

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Manuscript Preparation

Cover Sheet and Abstract

The cover sheet should include the following information:
Title of the article submission (not exceeding 60 characters)
Student Author's name
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Excluding the article title, none of the former information should be found anywhere else in the article submission to ensure anonymity during the blind review process. The cover page should contain the title, student author's name, and the faculty advisor's name.

The following page should include the article title at the top of the page followed by the abstract of the submission. This abstract should be used as an opportunity to give the reader a preview to the article and what conclusions were reached due in part to the contributions of the research. The abstract should be about 125 words but not exceeding 175 words.

Text and Style Layout

Submissions considered for publication must be double-spaced in 12-point Times or Times New Roman font, following the standard 8.5 x 11 page margins, and be completed using the Microsoft Word format. No specific length of manuscript is required but it should not exceed 3,500 words (14-page limit). The body of the article should follow a clearly organized order of information presentation and can be written in either past or present tense as long as the manuscript is consistent with American Psychological Association (APA) 5th Edition guidelines. Included in each submission should be a clearly defined introduction, main body, and closing remarks. The heading for each of these subsequent sections along with what information is presented within each section is dependant upon what is considered appropriate research for the author's corresponding field of study. It is at the discretion of the primary researcher and their selected faculty advisor to decide this information.

Tables and pictures are encouraged and they should be prepared precisely for submission, as they are to appear in the Journal. Tables should be easy to read, clearly labeled with a brief, to-the-point title, and should be limited to not more than 5 tables or graphs in one submission. Pictures need to be saved in .EPS or .TIFF format so that they have

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References

A comprehensive citation of references needs to follow the conclusion of the article using the latest version of the American Psychological Association (APA) guidelines. The APA guidelines will also assist the researcher in properly locating graphs, charts, or photographs within the research article and then identifying them within the text. As the University of Wisconsin Stout is a diversified university with numerous disciplines of knowledge being practiced, alternative methods of reference formatting will be accepted if the researcher's particular academic major does not utilize APA as its primary method of educational reporting. For those submissions that are not following APA format, the format that is being used should be clearly annotated following the author's academic standing on the cover page of the manuscript.

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Short Title of Student's Article:

1. **Quality of writing and other presentations (figures, tables, exhibits)**

☐ Superior ☐ Good ☐ Minor Problems ☐ Major Problems ☐ Completely Inadequate

2. **Conceptual rigor (clarity of objectives, relevant literature, logical reasoning)**

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